United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Purdue University
Agricultural Experiment
Station and Indiana
Department of Natural
Resources, Division of Soil
Conservation and State
Soil Conservation Board

Soil Survey of Pulaski County, Indiana

NRCS Accessibility Statement

How To Use This Soil Survey

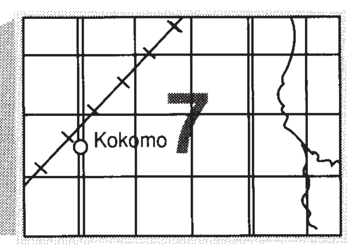
General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

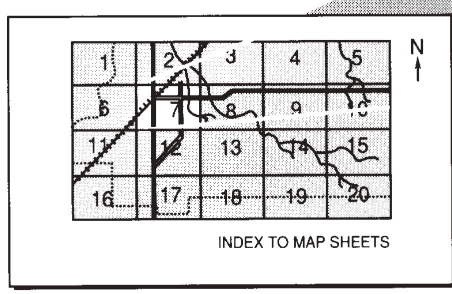
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.



MAP SHEET

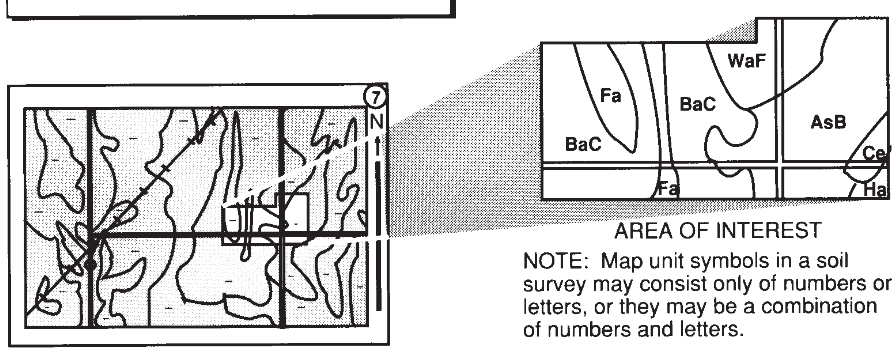


INDEX TO MAP SHEETS

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



MAP SHEET

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1998. Soil names and descriptions were approved in 1999. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1997. This survey was made cooperatively by the Natural Resources Conservation Service; the Purdue University Agricultural Experiment Station; and the Indiana Department of Natural Resources, Division of Soil Conservation and State Soil Conservation Board. The survey is part of the technical assistance furnished to the Pulaski County Soil and Water Conservation District. Financial assistance was provided by the Pulaski County Board of Commissioners.

Cover: Soybeans and urban development in an area of Moon-Selfridge complex, 0 to 1 percent slopes.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web. The address is http://www.nrcs.usda.gov.

Contents

Issued 2003

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Jane E. Hardisty
State Conservationist
Natural Resources Conservation Service

Soil Survey of Pulaski County, Indiana

By the Indiana Headwaters MLRA Soils Team, Natural Resources Conservation Service

Fieldwork by Wade D. Bott, Rex A. Brock, G. Franklin Furr, Jr., Gary L. Hudson, and Shane L. McBurnett, Natural Resources Conservation Service, and Byron Jenkinson, Purdue University

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Purdue University Agricultural Experiment Station and the Indiana Department of Natural Resources, Division of Soil Conservation and State Soil Conservation Board

PULASKI COUNTY is in northwestern Indiana (fig. 1). It has a total area of 278,110 acres, or 434 square miles. Winamac is the county seat. The survey area is part of Major Land Resource Areas (MLRAs) 98 and 111 (USDA, 1981).

The climate of the county provides ample precipitation and favorable temperatures for farming. The physiography consists of nearly level to strongly sloping outwash plains in the northern part of the county, nearly level to strongly sloping outwash plains and till plains in the eastern and southern parts, and nearly level to strongly sloping lacustrine plains and bedrock plains in the western part. The county is drained mainly by the Tippecanoe River and its tributaries and by the Kankakee River.

Manufacturing and farming are important sources of income in Pulaski County. The diversified industrial enterprises in the county provide full-time employment for many residents. Corn and soybeans are the main crops grown. Mint, popcorn, seed corn, hay, vegetables, and nursery crops also are important sources of income. Hogs, sheep, dairy cattle, and some beef cattle are the main varieties of livestock.

This soil survey updates the survey of Pulaski County published in 1968 (Pilgrim, 1968). It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section provides some general information about Pulaski County. It describes history and settlement; physiography, relief, and drainage; farming; water resources; climate; transportation facilities; schools; manufacturing and agricultural business services; and trends in population and land use.

History and Settlement

Prepared by Nancy L. Manion, RC&D assistant, Natural Resources Conservation Service, and Pamela Leman, education coordinator, Pulaski County Soil and Water Conservation District

In the late 1820s, the area that includes Pulaski County was shown on maps as “Indian Lands.” The Potawatomi Indians ceded this area to the United States on October 26, 1832. In 1835, the Indiana State Legislature authorized the establishment of Pulaski County, and the county was organized 4 years later. It was named in honor of an American Revolutionary War hero from Poland, Count Casimir Pulaski, who was a general under George Washington. The town of Winamac, named after an Indian chief who led the Potawatomi tribe at the Battle of Tippecanoe, became the county seat on May 8, 1939.

Figure 1.—Location of Pulaski County in Indiana.

Physiography, Relief, and Drainage

Pulaski County is mainly in the Tippecanoe River drainage basin, the mouth of which is at the Wabash River. The Wabash River drains into the Ohio River. A very small area in the northwestern part of the county is in the Kankakee River drainage basin, which drains into the Mississippi River.

Farming

In 1992, Pulaski County had 630 farms making up a total of 242,777 acres and the average farm size was 385 acres (Gann and Liles, 1994). By 1997, the number of farms had dropped to 531 and the number of acres of farmland was 236,332; the average farm size was 445 acres (Gann and Liles, 1999).

Corn, soybeans, and hay were the major crops grown in 1997. Pulaski County ranks second in popcorn production in Indiana (Gann and Liles, 2000).

Water Resources

The principal surface-water feature in Pulaski County is the Tippecanoe River and its many tributaries. The Tippecanoe River enters the county from Fulton County, near Monterey. It flows toward the northwest, crosses briefly into Starke County in the north, and then flows south across Pulaski County and into White County in the south.

Sandy and loamy soils and shallow aquifers are dominant in the western half of the county. Because the soils are highly permeable and the water table is at or near the surface in many places, this area is highly susceptible to ground-water contamination.

Water for cities, towns, and rural areas is obtained from municipal and private wells. Most of the water used in the county is ground water pumped from glacial aquifers. In the western part of the county, the glacial material is thin and most of the wells are in limestone bedrock. Some of these wells in the fossiliferous limestone are interbedded with sulfur-rich shale, which gives the water an objectionable smell and taste.

Regionally, the direction of ground-water flow generally follows the topography and ultimately is toward the Tippecanoe River and its major tributaries.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Winamac in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 25.5 degrees F and the average daily minimum temperature is 16.8 degrees. The lowest temperature on record, which occurred on January 20, 1985, is -29 degrees. In summer, the average temperature is 71.1 degrees and the average daily maximum temperature is 82.1 degrees. The highest recorded temperature, which occurred on August 18, 1988, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 37.4 inches. Of this total, 21.4 inches, or 57 percent, usually falls in May through October. The growing season for most crops falls within this period. The heaviest 1-day rainfall on record was 4.8 inches at Winamac on July 2, 1950. Thunderstorms occur on about 42 days each year, and most occur between April and September.

The average seasonal snowfall is 29.2 inches. The greatest snow depth at any one time during the period of record was 16 inches, recorded on February 12, 1979. On an average, 44 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year. The heaviest 1-day snowfall on record was 10 inches, recorded on January 26, 1978.

The average relative humidity in midafternoon is about 62 percent. Humidity is higher at night, and the average at dawn is about 82 percent. The sun shines 73 percent of the time possible in summer and 44 percent in winter. The prevailing wind is from the west or southwest. Average windspeed is highest, between 11 and 12 miles per hour, from December to April.

Transportation Facilities

Prepared by Nancy L. Manion, RC&D assistant, Natural Resources Conservation Service, and Pamela Leman, education coordinator, Pulaski County Soil and Water Conservation District

Several roads extending across the county were started before the county was organized. U.S. Highway 421 runs north and south in the western part of the county, through Francesville and Medaryville. U.S. Highway 35 runs generally north and south through the eastern part of the county through Winamac and Star City. State Highway 14 runs east and west through Winamac; State Highway 119 runs from Winamac southwest through Pulaski; State Highway 39 runs north and south through the center of the western half of the county; State Highway 114 is in the southwestern part of the county; and State Highway 143 is in the northwestern part.

An airport is north of Winamac and can accommodate small jets.

The first railroad to cross Pulaski County was built in 1853-54 across the western part of the county. It was called the Monon Railroad and was known as a luxury railroad line. In 1860-61, the Pennsylvania system was built. Additional railways were built across the county in 1882 and 1901.

Schools

Prepared by Delores Furr, retired teacher, Eastern Pulaski Community School Corporation

Four public school systems serve Pulaski County. Population and development trends have been on the increase throughout the county, and these school systems are addressing ways to increase the capacity of their facilities to accommodate more students. There are also several private schools in the county that provide education from the kindergarten level through twelfth grade.

Each of the public school systems has outdoor labs where the students can study environmental and conservation education programs. Information in this soil survey can be used in these programs.

Pulaski County has very strong, active 4-H and FFA programs, which promote a project that teaches the conservation of soil and water. The Agricultural Extension Service provides information to all citizens upon request. Special newspaper articles and radio and television programs provide soils information as needed.

Manufacturing and Agricultural Business Services

Prepared by Nancy L. Manion, RC&D assistant, Natural Resources Conservation Service

Throughout the county, several elevators serve the agricultural community by storing and marketing grain, mainly corn and soybeans. Other agriculture-related businesses include equipment, fertilizer, chemical, and seed dealers. A small amount of alternative agricultural products, such as mint, potatoes, and seed corn (for both field corn and popcorn) also are produced. The county has several swine confinement operations and a large chicken confinement operation. A few feeder cattle are grown for beef production.

Several manufacturing firms are located in Pulaski County. In Winamac, manufacturing includes a corporation that adapts vehicles to accommodate people with disabilities. These vehicles are marketed nationwide. Also in Winamac are a corporation that produces metal tubing for industrial use nationwide and a corporation that makes waste containers and lift hoists. There are numerous smaller manufacturing operations in the county.

In the western part of the county are a drain tile corporation, which produces plastic drain tile that is marketed across the central United States; a large company that produces and markets seed corn; and two major limestone quarries that ship crushed stone throughout the northern and central parts of the state.

Trends in Population and Land Use

In 1990, Pulaski County had a population of 12,643 (Gann and Liles, 1994). The population increased by about 6 percent between 1990 and 1999; it was 13,341 in 1999 (Gann and Liles, 2000).

During the period from 1992 to 1997, the amount of urbanized land increased by about 2 percent and all categories of agricultural land decreased by the same amount. In 1997, 85 percent of the county was used for agricultural purposes. Approximately 921 acres of land is being converted to urban uses each year (Gann and Liles, 1994 and 2000). This trend is expected to continue at the same rate for several years.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in Pulaski County. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. These broad areas are called associations. Each association on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Brookston-Crosier-Selfridge Association

Nearly level to gently sloping, somewhat poorly drained and poorly drained soils that formed in till or in outwash over till; on till plains

Setting

Composite landform: Till plains
Composite slopes: 0 to 4 percent

Composition

Extent of the association in the survey area: 14 percent
Extent of the soils in the association (fig. 2):
Brookston soils—50 percent
Crosier soils—16 percent
Selfridge soils—12 percent
Soils of minor extent—22 percent

Soil Properties and Qualities

Brookston

Position on the landform: Depressions
Parent material: Till
Drainage class: Poorly drained
Texture of the surface layer: Loam
Slope: 0 to 1 percent

Crosier

Position on the landform: Swells
Parent material: Till
Drainage class: Somewhat poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 4 percent

Selfridge

Position on the landform: Swells
Parent material: Outwash over till
Drainage class: Somewhat poorly drained
Texture of the surface layer: Loamy fine sand
Slope: 0 to 1 percent

Soils of Minor Extent

- Miami soils on knolls and backslopes
- Williamstown soils on backslopes
- Oakville soils on hillslopes and knolls

Use and Management

Major use: Cropland

Cropland

Management concerns: Wetness, surface and subsurface compaction, ponding, wind erosion

Dwellings

Management concerns: Depth to saturated zone, the shrink-swell potential, ponding

Local roads and streets

Management concerns: Ponding, depth to saturated zone, low strength, the shrink-swell potential, frost action

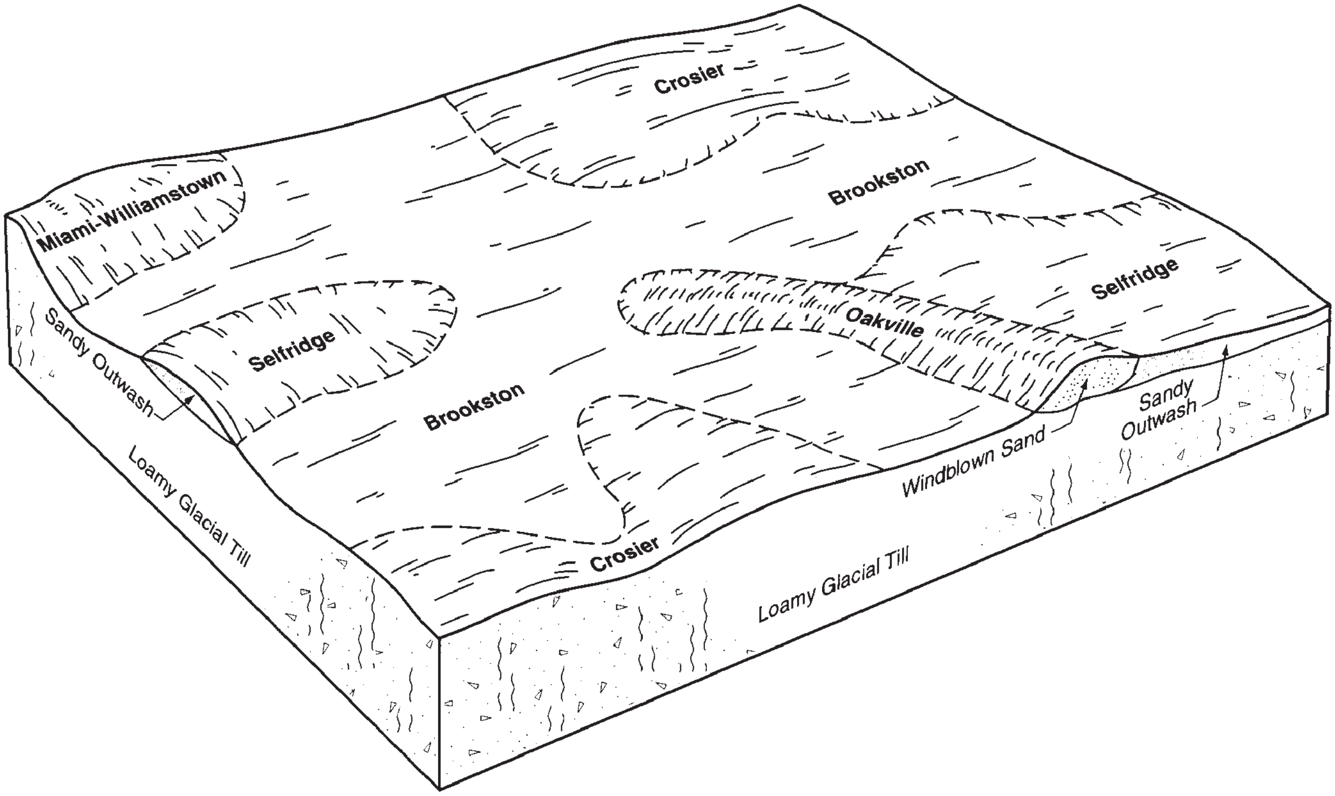


Figure 2.—Typical pattern of soils and underlying material in the Brookston-Crosier-Selfridge association.

Septic tank absorption fields

Management concerns: Depth to saturated zone, restricted permeability, ponding

Woodland

Management concerns: Wetness, low strength

2. Williamstown-Metea-Riddles Association

Nearly level to gently sloping, well drained and moderately well drained soils that formed in till or in outwash over till; on till plains

Setting

Composite landform: Till plains
Composite slopes: 0 to 5 percent

Composition

Extent of the association in the survey area: 10 percent
Extent of the soils in the association (fig. 3):
Williamstown soils—29 percent
Metea soils—21 percent
Riddles soils—18 percent
Soils of minor extent—32 percent

Soil Properties and Qualities

Williamstown

Position on the landform: Swells and backslopes
Parent material: Till
Drainage class: Moderately well drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 5 percent

Metea

Position on the landform: Shoulders and backslopes
Parent material: Outwash over till
Drainage class: Well drained
Texture of the surface layer: Loamy fine sand
Slope: 1 to 5 percent

Riddles

Position on the landform: Swells
Parent material: Till
Drainage class: Well drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 2 percent

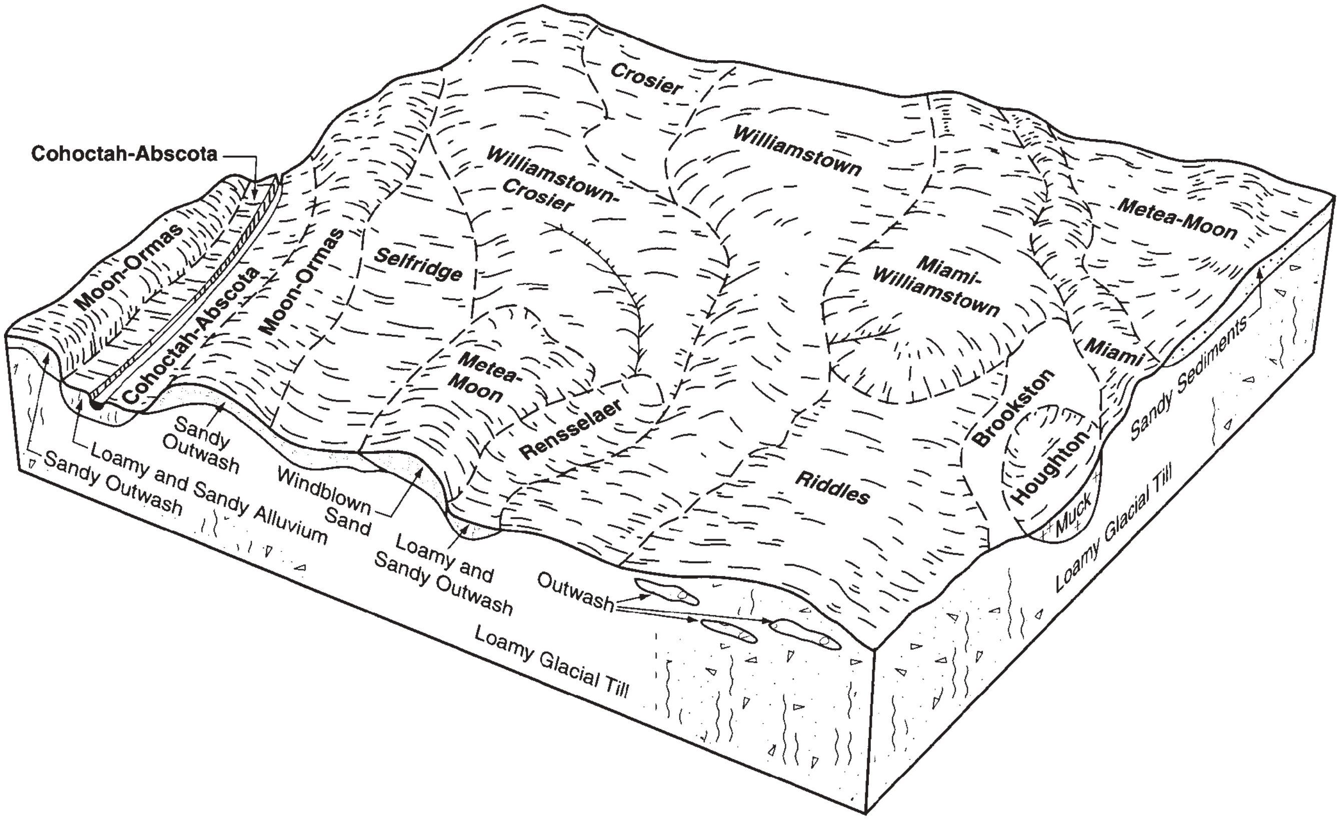


Figure 3.—Typical pattern of soils and underlying material in the Williamstown-Metea-Riddles association.

Soils of Minor Extent

- Miami soils on knolls or backslopes
- Moon soils on backslopes
- Crosier and Selfridge soils on swells
- Ormas soils on swells or backslopes
- Brookston and Houghton soils in depressions
- Cohoctah and Abscota soils on flood plains

Use and Management

Major use: Cropland

Cropland

Management concerns: Wind erosion, compaction, limited available water capacity, water erosion

Dwellings

Management concerns: The shrink-swell potential, depth to saturated zone

Local roads and streets

Management concerns: Frost action, low strength, the shrink-swell potential, depth to saturated zone

Septic tank absorption fields

Management concerns: Depth to saturated zone, restricted permeability

Woodland

Management concerns: Low strength

3. Brookston-Odell-Corwin Association

Nearly level, moderately well drained to poorly drained soils that formed in till; on till plains

Setting

Composite landform: Till plains
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 1 percent
Extent of the soils in the association (fig. 4):
Brookston soils—50 percent
Odell soils—20 percent

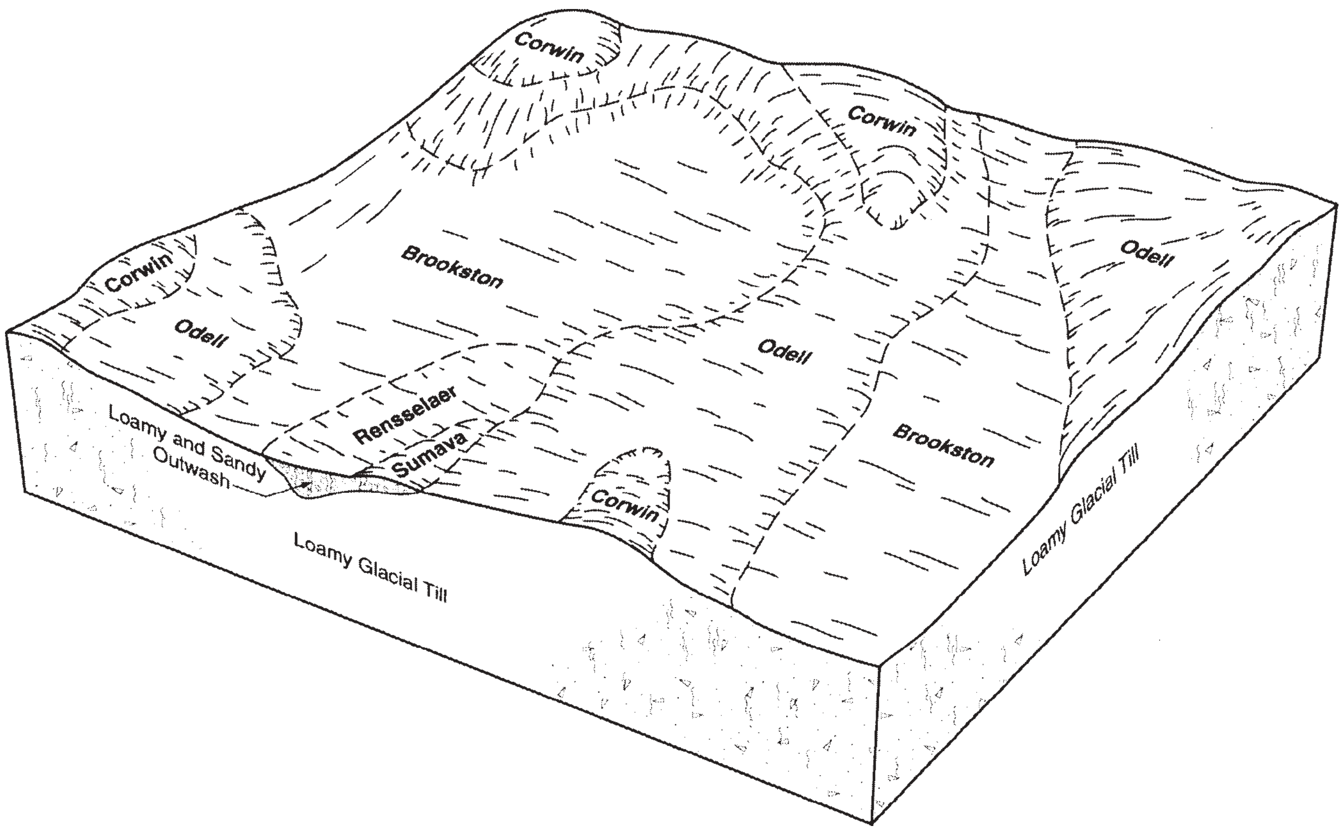


Figure 4.—Typical pattern of soils and underlying material in the Brookston-Odell-Corwin association.

Corwin soils—13 percent
Soils of minor extent—17 percent

Soil Properties and Qualities

Brookston

Position on the landform: Depressions
Parent material: Till
Drainage class: Poorly drained
Texture of the surface layer: Loam
Slope: 0 to 1 percent

Odell

Position on the landform: Swells
Parent material: Till
Drainage class: Somewhat poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Corwin

Position on the landform: Swells
Parent material: Till
Drainage class: Moderately well drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Soils of Minor Extent

- Sumava soils on swells
- Rensselaer soils in depressions

Use and Management

Major use: Cropland

Cropland

Management concerns: Wetness, surface and subsurface compaction, ponding

Dwellings

Management concerns: Depth to saturated zone, the shrink-swell potential, ponding

Local roads and streets

Management concerns: Ponding, depth to saturated zone, low strength, the shrink-swell potential, frost action

Septic tank absorption fields

Management concerns: Depth to saturated zone, restricted permeability, ponding

Woodland

Management concerns: Wetness, low strength

4. Maumee-Goodell-Budd Association

Nearly level, somewhat poorly drained and poorly drained soils that formed in outwash and in outwash over till; on till plains and outwash plains

Setting

Composite landform: Till plains and outwash plains
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 7 percent
Extent of the soils in the association (fig. 5):
- Maumee soils—30 percent
- Goodell soils—28 percent
- Budd soils—10 percent
- Soils of minor extent—32 percent

Soil Properties and Qualities

Maumee

Position on the landform: Depressions and broad flats
Parent material: Outwash
Drainage class: Poorly drained
Texture of the surface layer: Loamy fine sand
Slope: 0 to 1 percent

Goodell

Position on the landform: Depressions
Parent material: Outwash over till
Drainage class: Poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Budd

Position on the landform: Swells
Parent material: Outwash over till
Drainage class: Somewhat poorly drained

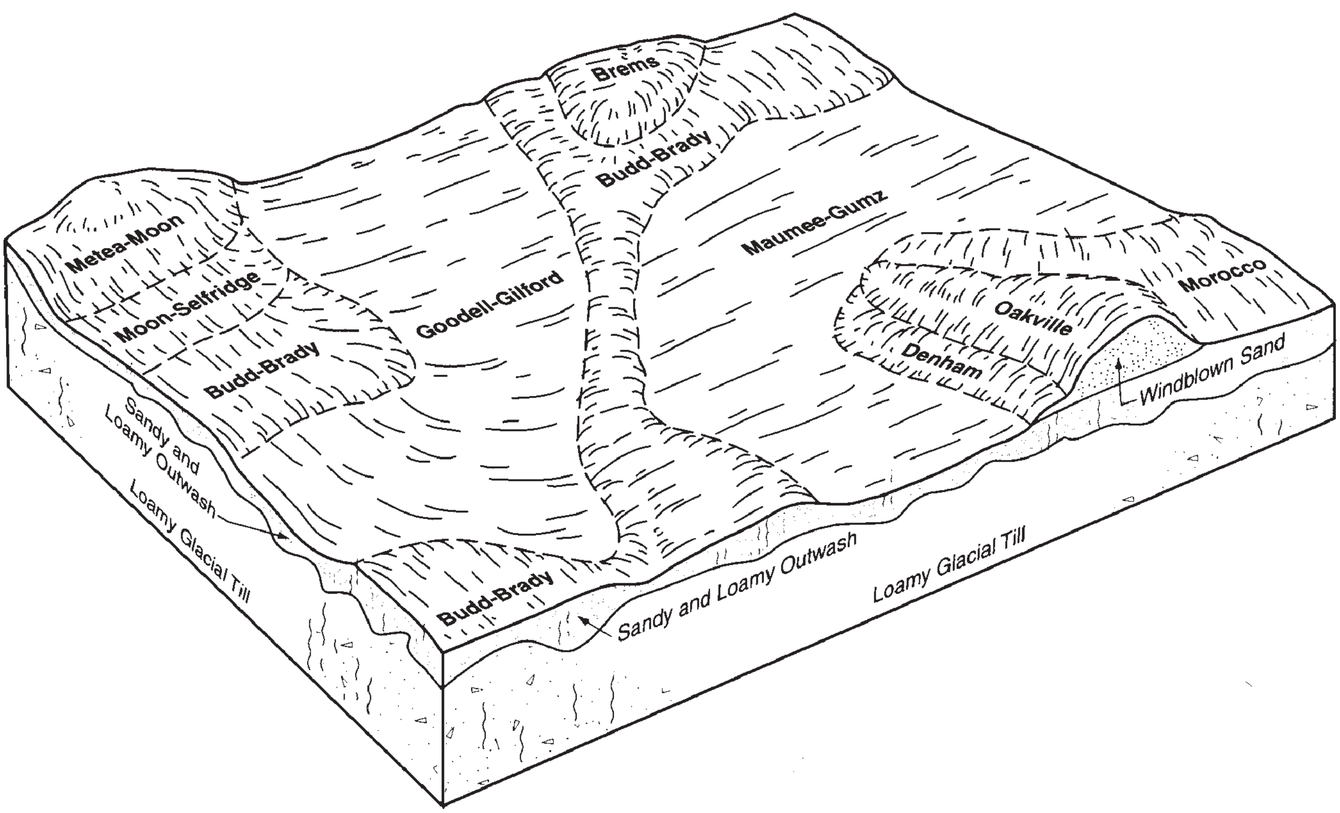


Figure 5.—Typical pattern of soils and underlying material in the Maumee-Goodell-Budd association.

Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Soils of Minor Extent

- Gilford and Gumz soils in depressions
- Brady, Morocco, and Selfridge soils on swells
- Moon soils on backslopes and swells
- Brems and Denham soils on footslopes and swells

Use and Management

Major use: Cropland

Cropland

Management concerns: Wetness, wind erosion, ponding, limited available water capacity

Dwellings

Management concerns: Ponding, depth to saturated zone

Local roads and streets

Management concerns: Frost action, ponding, depth to saturated zone

Septic tank absorption fields

Management concerns: Ponding, filtering capacity, depth to saturated zone

Woodland

Management concerns: Wetness, low strength

5. Brookston-Odell-Navunon Association

Nearly level, somewhat poorly drained and poorly drained soils that formed in till; on till plains

Setting

Composite landform: Till plains
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 5 percent
Extent of the soils in the association (fig. 6):
Brookston soils—30 percent
Odell soils—21 percent
Navunon soils—20 percent
Soils of minor extent—29 percent

Soil Properties and Qualities

Brookston

Position on the landform: Depressions
Parent material: Till
Drainage class: Poorly drained
Texture of the surface layer: Loam
Slope: 0 to 1 percent

Odell

Position on the landform: Swells
Parent material: Till
Drainage class: Somewhat poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Navunon

Position on the landform: Depressions
Parent material: Till
Drainage class: Poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Soils of Minor Extent

- Francesville, Corwin, Morocco, and Selfridge soils on swells
- Gilford and Moon soils in depressions
- Monon soils in depressions
- Oakville soils on hillslopes or knolls

Use and Management

Major use: Cropland

Cropland

Management concerns: Wetness, surface and subsurface compaction, erosion hazard, ponding

Dwellings

Management concerns: Depth to saturated zone, the shrink-swell potential, ponding, depth to hard bedrock

Local roads and streets

Management concerns: Ponding, depth to saturated zone, low strength, the shrink-swell potential, frost action

Septic tank absorption fields

Management concerns: Depth to saturated zone, restricted permeability, ponding, depth to bedrock

Woodland

Management concerns: Wetness, low strength

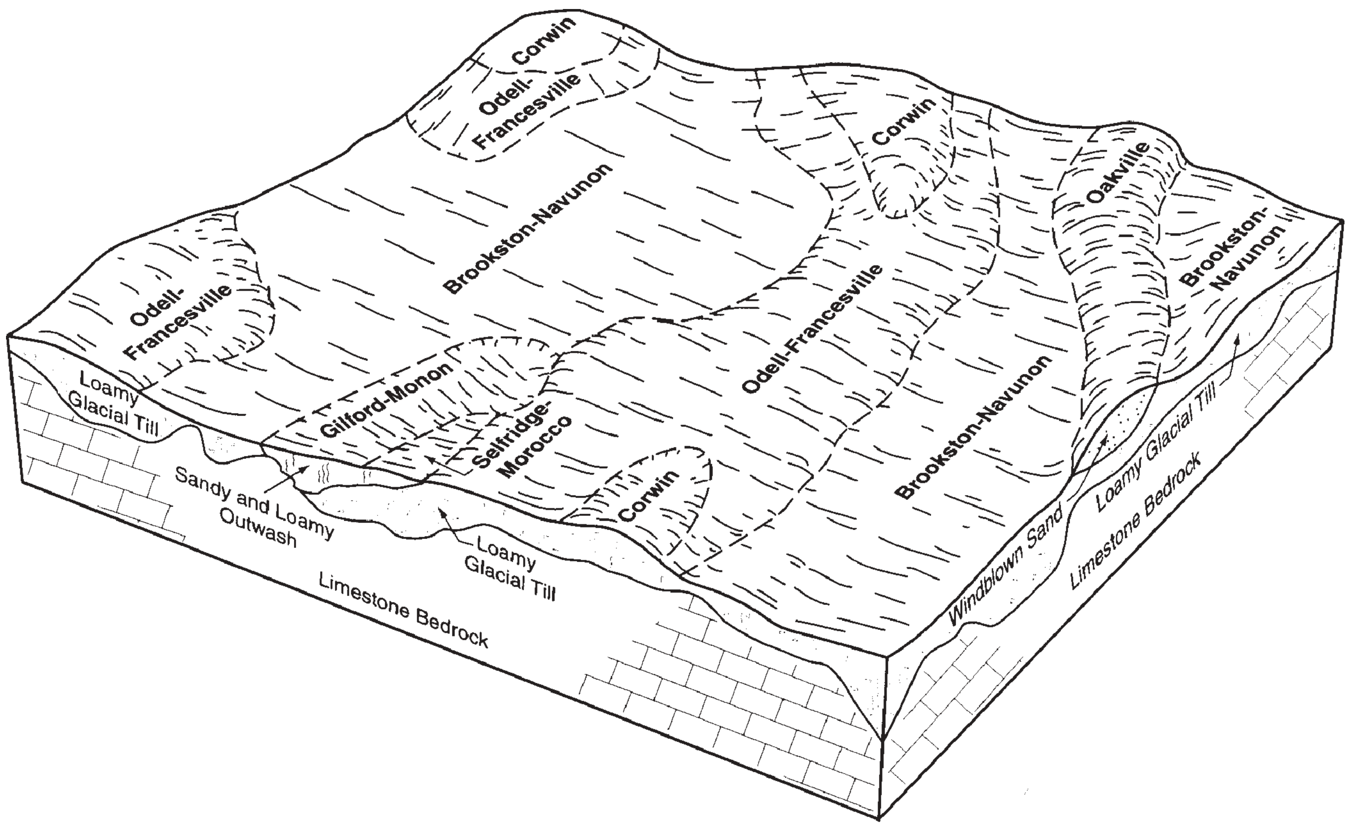


Figure 6.—Typical pattern of soils and underlying material in the Brookston-Odell-Navunon association.

6. Strole-Rensselaer-Milford Association

Nearly level, somewhat poorly drained and poorly drained soils that formed in lacustrine sediments or outwash materials; on lake plains and outwash plains

Setting

Composite landform: Lake plains and outwash plains
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 5 percent
Extent of the soils in the association (fig. 7):
Strole soils—24 percent
Rensselaer soils—22 percent
Milford soils—21 percent
Soils of minor extent—33 percent

Soil Properties and Qualities

Strole

Position on the landform: Swells
Parent material: Lacustrine deposits
Drainage class: Somewhat poorly drained
Texture of the surface layer: Silt loam
Slope: 0 to 1 percent

Rensselaer

Position on the landform: Broad depressions
Parent material: Outwash
Drainage class: Poorly drained
Texture of the surface layer: Loam
Slope: 0 to 1 percent

Milford

Position on the landform: Broad depressions
Parent material: Lacustrine deposits
Drainage class: Poorly drained
Texture of the surface layer: Silty clay loam
Slope: 0 to 1 percent

Soils of Minor Extent

- Mermill soils in depressions
- Radioville soils in broad depressions
- Bronson, Medaryville, and Whiskerville soils on swells

Use and Management

Major use: Cropland

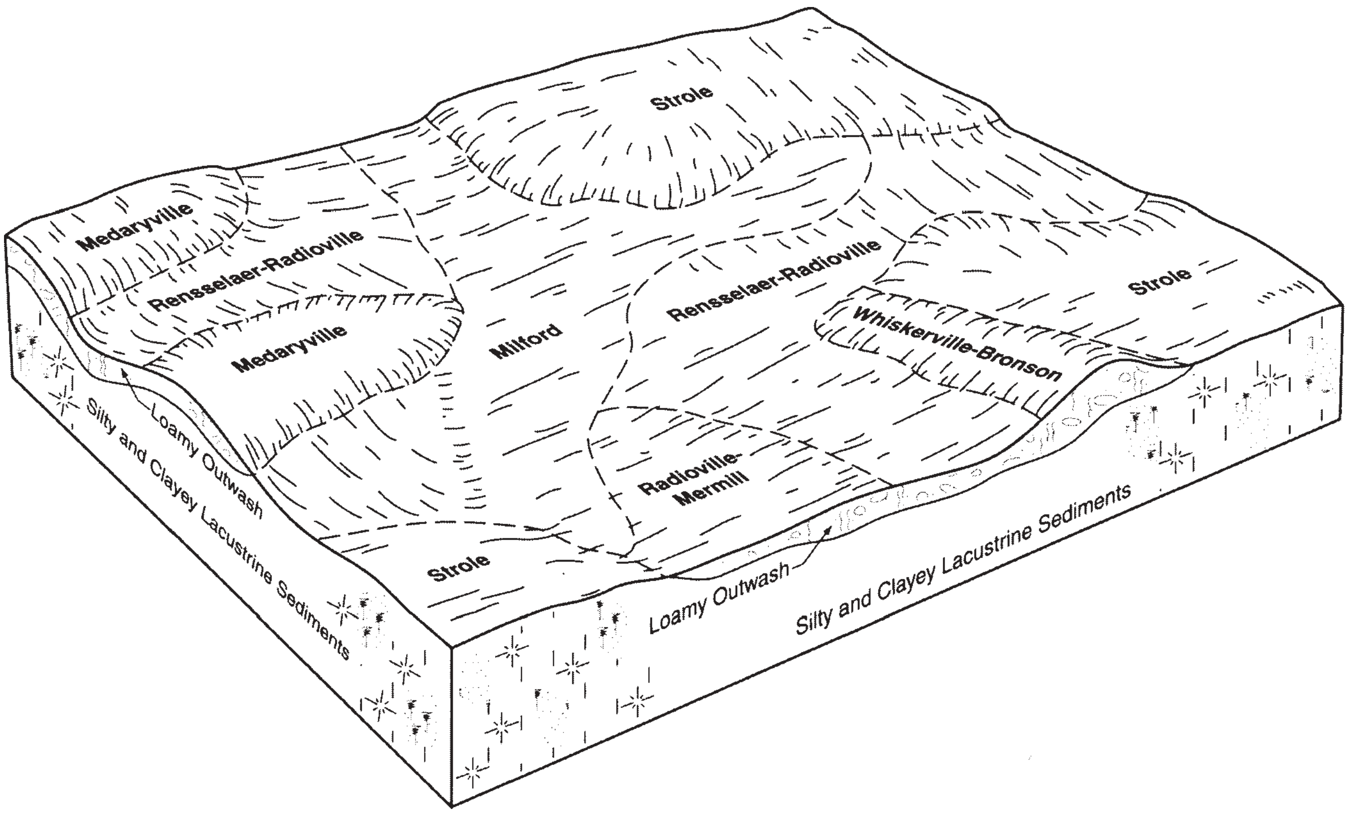


Figure 7.—Typical pattern of soils and underlying material in the Strole-Rensselaer-Milford association.

Cropland

Management concerns: Wetness, surface and subsurface compaction, ponding

Dwellings

Management concerns: Depth to saturated zone, the shrink-swell potential, ponding

Local roads and streets

Management concerns: Ponding, depth to saturated zone, low strength, frost action, the shrink-swell potential

Septic tank absorption fields

Management concerns: Ponding, depth to saturated zone, restricted permeability

Woodland

Management concerns: Ponding, wetness, low strength

7. Whitepost-Headlee-Whiskerville Association

Nearly level, moderately well drained to poorly drained soils that formed in outwash over lacustrine materials; on lake plains

Setting

Composite landform: Lake plains
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 3 percent
Extent of the soils in the association (fig. 8):
Whitepost soils—28 percent
Headlee soils—22 percent
Whiskerville soils—17 percent
Soils of minor extent—33 percent

Soil Properties and Qualities

Whitepost

Position on the landform: Depressions

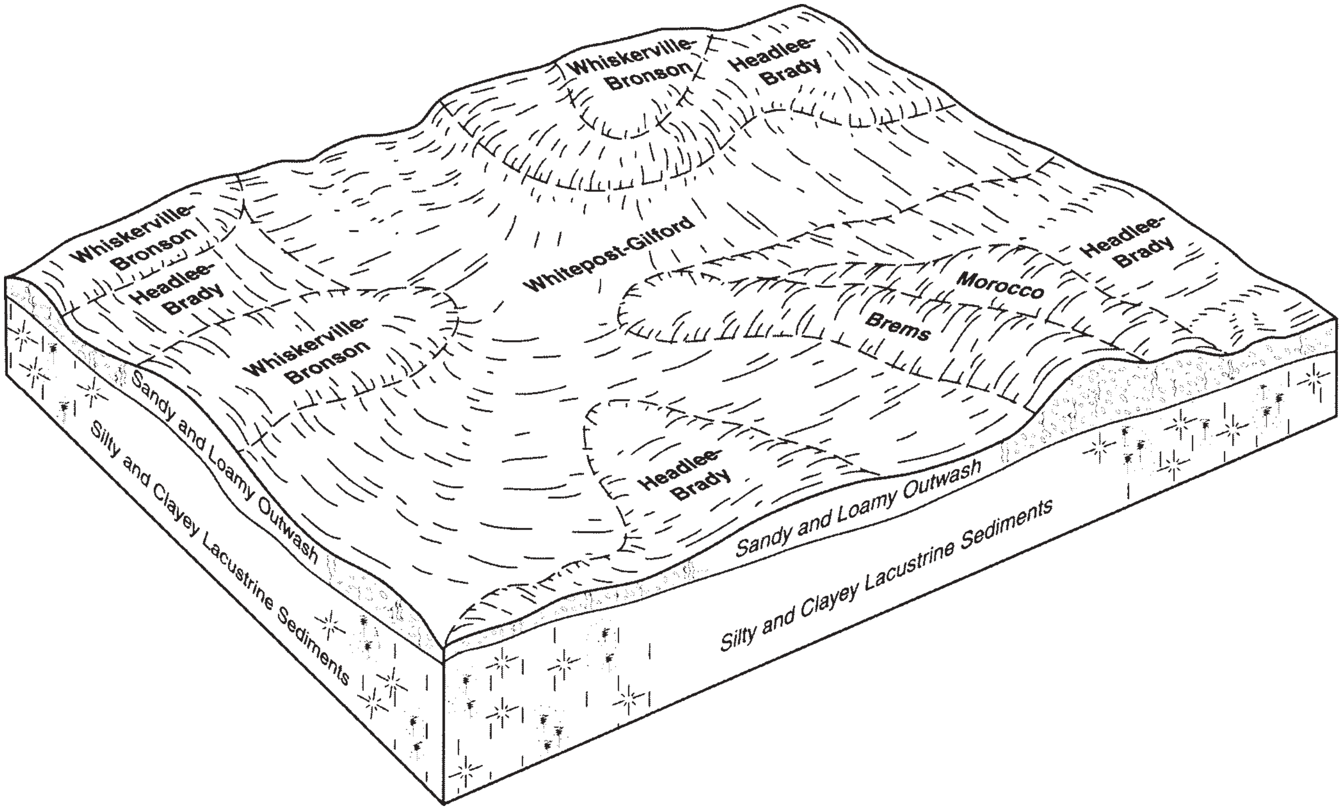


Figure 8.—Typical pattern of soils and underlying material in the Whitepost-Headlee-Whiskerville association.

Parent material: Outwash over lacustrine deposits
Drainage class: Poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Headlee

Position on the landform: Swells
Parent material: Outwash over lacustrine deposits
Drainage class: Somewhat poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Whiskerville

Position on the landform: Swells
Parent material: Outwash over lacustrine deposits
Drainage class: Moderately well drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Soils of Minor Extent

- Brady, Brems, Bronson, and Morocco soils on swells
- Gilford soils in depressions

Use and Management

Major use: Cropland

Cropland

Management concerns: Wetness, surface and subsurface compaction, wind erosion, limited available water capacity, ponding

Dwellings

Management concerns: Depth to saturated zone, the shrink-swell potential, ponding

Local roads and streets

Management concerns: Ponding, depth to saturated zone, low strength, frost action

Septic tank absorption fields

Management concerns: Depth to saturated zone, restricted permeability, filtering capacity, ponding

Woodland

Management concerns: Ponding, wetness, low strength

8. Maumee-Morocco-Newton Association

Nearly level, poorly drained soils that formed in outwash; on outwash plains

Setting

Composite landform: Outwash plains
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 34 percent
Extent of the soils in the association (fig. 9):
Maumee soils—65 percent
Morocco soils—17 percent
Newton soils—5 percent
Soils of minor extent—13 percent

Soil Properties and Qualities

Maumee

Position on the landform: Depressions and flats
Parent material: Outwash
Drainage class: Poorly drained
Texture of the surface layer: Loamy fine sand
Slope: 0 to 1 percent

Morocco

Position on the landform: Swells
Parent material: Outwash
Drainage class: Poorly drained
Texture of the surface layer: Loamy fine sand
Slope: 0 to 1 percent

Newton

Position on the landform: Depressions
Parent material: Outwash
Drainage class: Poorly drained
Texture of the surface layer: Loamy fine sand
Slope: 0 to 1 percent

Soils of Minor Extent

- Adrian and Gilford soils in depressions
- Brems and Denham soils on swells and footslopes
- Oakville soils on hillslopes and knolls

Use and Management

Major use: Cropland

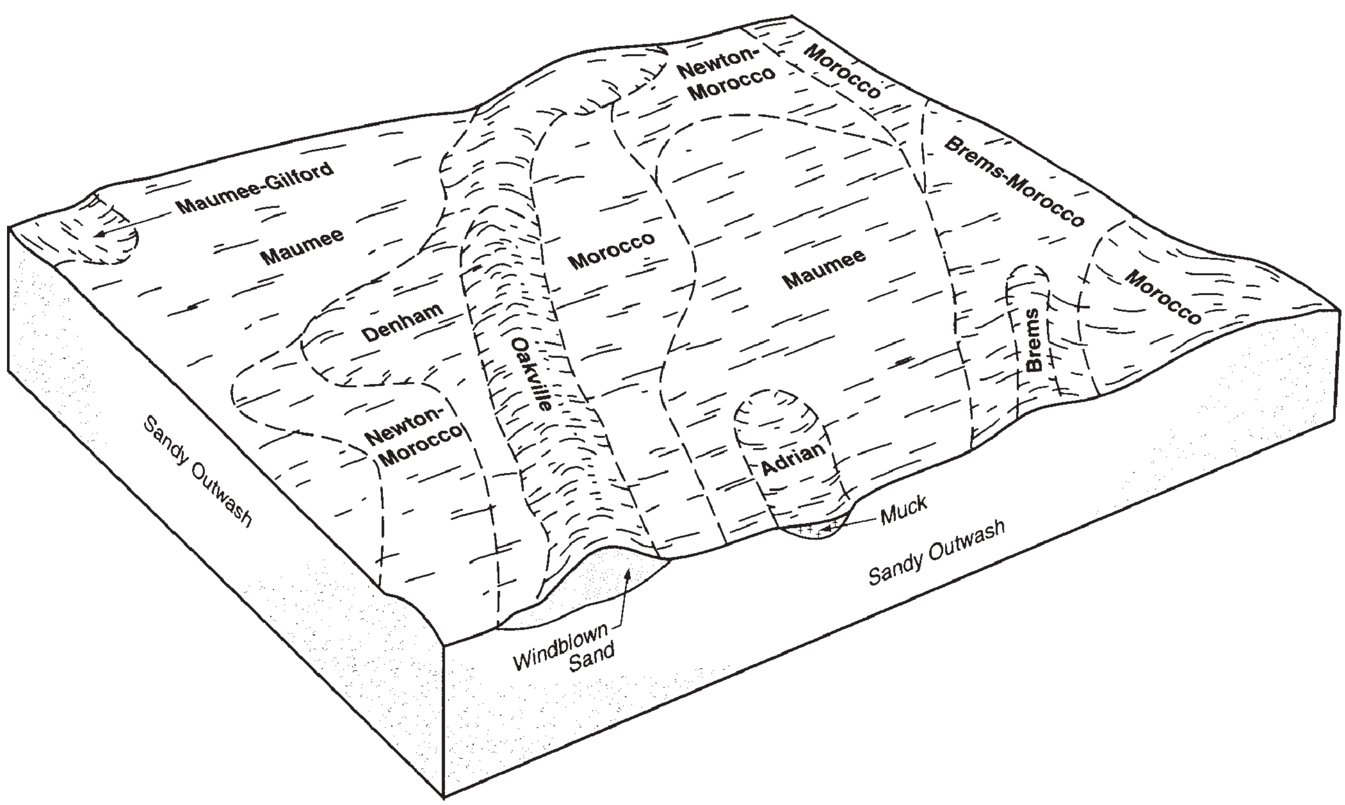


Figure 9.—Typical pattern of soils and underlying material in the Maumee-Morocco-Newton association.

Cropland

Management concerns: Wetness, wind erosion, limited available water capacity, ponding

Dwellings

Management concerns: Ponding, depth to saturated zone, frost action

Local roads and streets

Management concerns: Frost action, depth to saturated zone, ponding

Septic tank absorption fields

Management concerns: Ponding, poor filtering capacity, depth to saturated zone

Woodland

Management concerns: Ponding, wetness, low strength

9. Gilford-Brady-Granby Association

Nearly level, somewhat poorly drained and poorly drained soils that formed in outwash; on outwash plains

Setting

Composite landform: Outwash plains
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 3 percent
Extent of the soils in the association (fig. 10):
Gilford soils—24 percent
Brady soils—22 percent
Granby soils—21 percent
Soils of minor extent—33 percent

Soil Properties and Qualities

Gilford

Position on the landform: Depressions

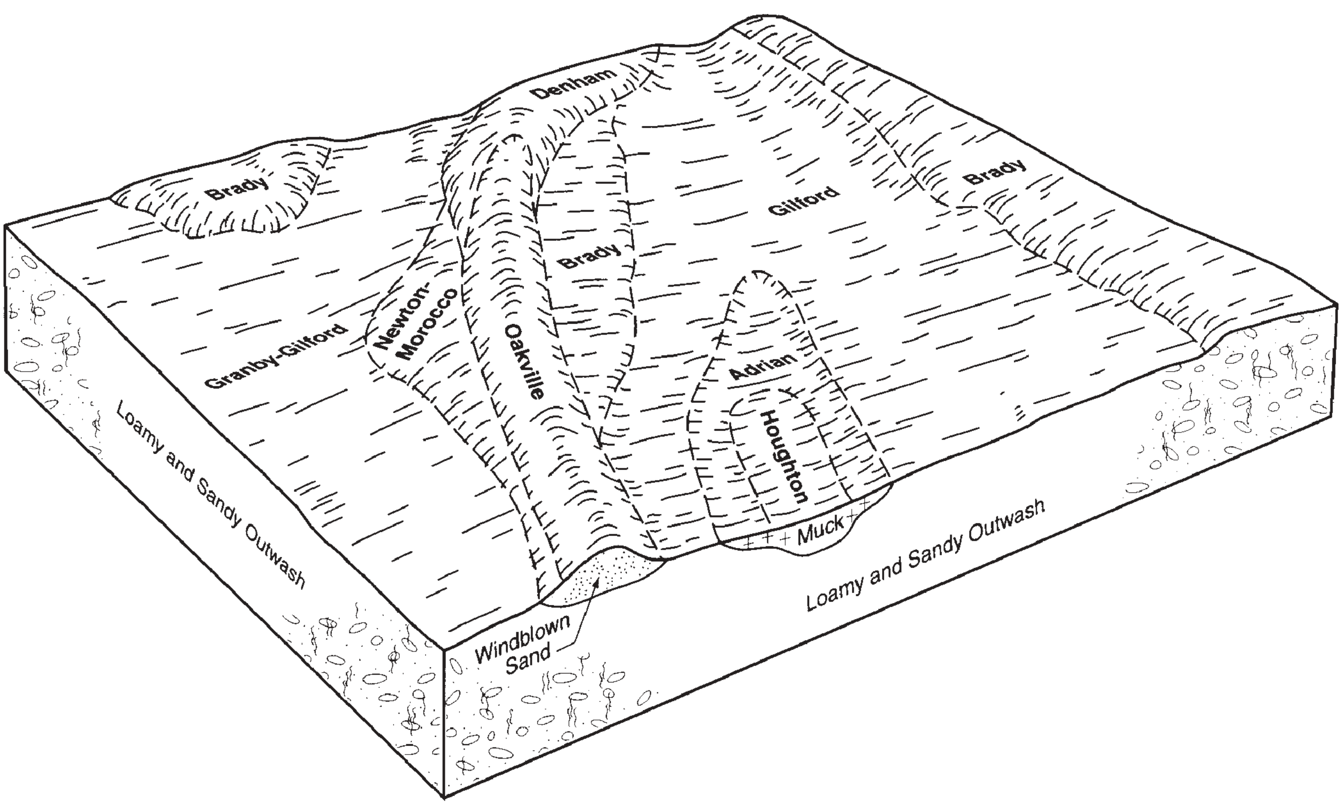


Figure 10.—Typical pattern of soils and underlying material in the Gilford-Brady-Granby association.

Parent material: Outwash
Drainage class: Poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Brady

Position on the landform: Swells
Parent material: Outwash
Drainage class: Somewhat poorly drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 1 percent

Granby

Position on the landform: Depressions
Parent material: Outwash
Drainage class: Poorly drained
Texture of the surface layer: Loamy fine sand
Slope: 0 to 1 percent

Soils of Minor Extent

- Morocco soils on swells
- Adrian, Houghton, and Newton soils in depressions
- Denham soils on swells and footslopes
- Oakville soils on hillslopes and knolls

Use and Management

Major use: Cropland

Cropland

Management concerns: Wetness, wind erosion, limited available water capacity, ponding

Dwellings

Management concerns: Ponding, depth to saturated zone

Local roads and streets

Management concerns: Frost action, ponding, depth to saturated zone

Septic tank absorption fields

Management concerns: Ponding, poor filtering capacity, depth to saturated zone

Woodland

Management concerns: Ponding, wetness, low strength

10. Cohoctah-Abscota Association

Nearly level, moderately well drained and poorly drained soils that formed in alluvium; on flood plains

Setting

Composite landform: Flood plains
Composite slopes: 0 to 2 percent

Composition

Extent of the association in the survey area: 1 percent
Extent of the soils in the association (fig. 11):
Cohoctah soils—57 percent
Abscota soils—30 percent
Soils of minor extent—13 percent

Soil Properties and Qualities

Cohoctah

Position on the landform: Backswamps and backlands
Parent material: Alluvium
Drainage class: Poorly drained
Texture of the surface layer: Loam
Slope: 0 to 1 percent

Abscota

Position on the landform: Natural levees and backlands
Parent material: Alluvium
Drainage class: Moderately well drained
Texture of the surface layer: Fine sandy loam
Slope: 0 to 2 percent

Soils of Minor Extent

- Adrian soils in depressions
- Oakville soils on backslopes

Use and Management

Major uses: Woodland, recreation, wildlife habitat

Cropland

Management concerns: Flooding, wetness, wind erosion, limited available water capacity

Dwellings

Management concerns: Flooding, depth to saturated zone

Local roads and streets

Management concerns: Flooding, depth to saturated zone, frost action

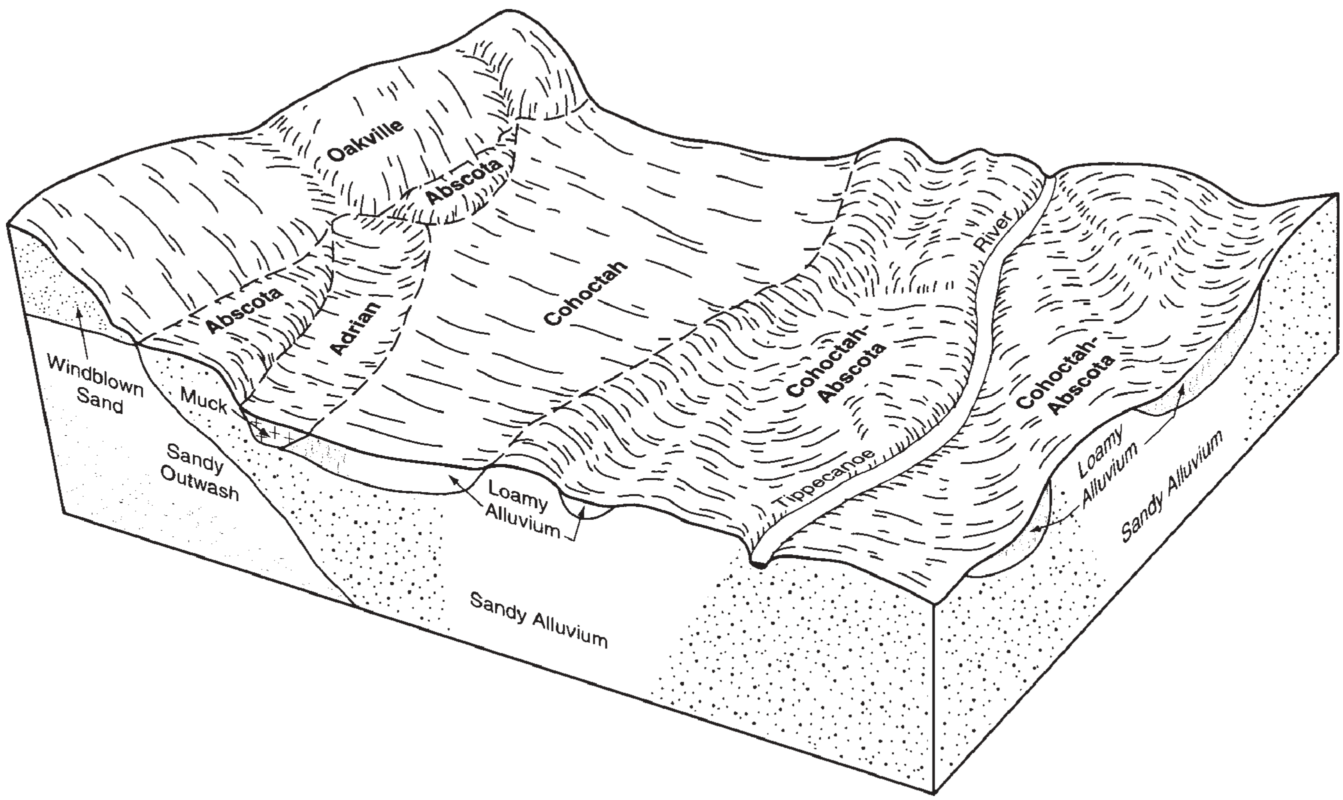


Figure 11.—Typical pattern of soils and underlying material in the Cohoctah-Abscota association.

Septic tank absorption fields

Management concerns: Filtering capacity, depth to saturated zone, flooding

Woodland

Management concerns: Flooding, wetness, low strength

11. Oakville-Denham-Brems Association

Nearly level to moderately steep, excessively drained and moderately well drained soils that formed in eolian sand or in outwash; on dunes on outwash plains and till plains

Setting

Composite landform: Dunes on outwash plains and till plains
Composite slopes: 0 to 18 percent

Composition

Extent of the association in the survey area: 16 percent
Extent of the soils in the association (fig. 12):
Oakville soils—35 percent
Denham soils—25 percent
Brems soils—15 percent
Soils of minor extent—25 percent

Soil Properties and Qualities

Oakville

Position on the landform: Hillslopes
Parent material: Eolian sand
Drainage class: Excessively drained
Texture of the surface layer: Fine sand
Slope: 0 to 18 percent

Denham

Position on the landform: Swells, footslopes, and knolls
Parent material: Eolian sand
Drainage class: Moderately well drained
Texture of the surface layer: Fine sand
Slope: 0 to 5 percent

Brems

Position on the landform: Swells and footslopes
Parent material: Outwash
Drainage class: Moderately well drained
Texture of the surface layer: Loamy fine sand
Slope: 0 to 1 percent

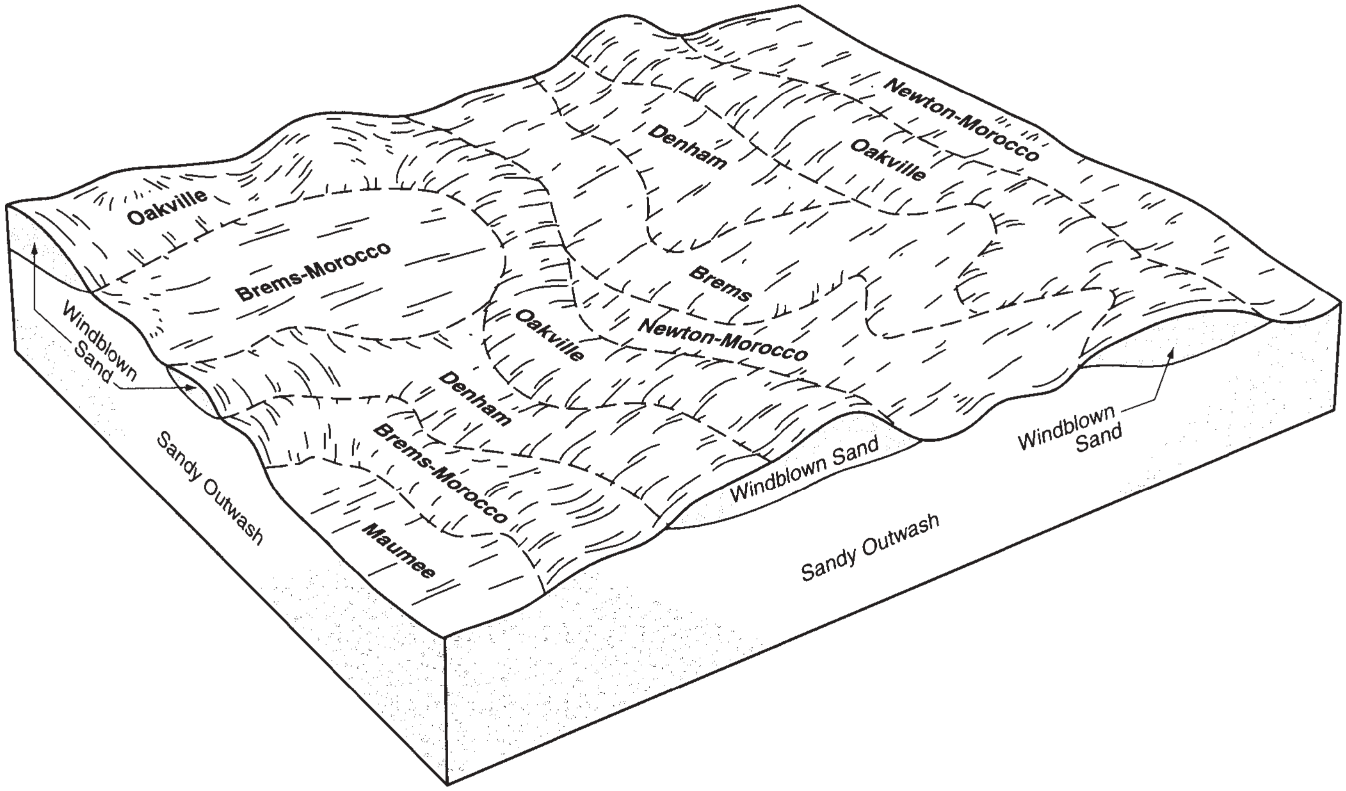


Figure 12.—Typical pattern of soils and underlying material in the Oakville-Denham-Brems association.

Soils of Minor Extent

- Newton and Maumee soils in depressions
- Morocco soils on swells and footslopes

Use and Management

Major uses: Cropland, forestland, wildlife habitat

Cropland

Management concerns: Limited available water capacity, wind erosion, water erosion, slope

Dwellings

Management concerns: Slope, depth to saturated zone

Local roads and streets

Management concerns: Slope

Septic tank absorption fields

Management concerns: Depth to saturated zone, filtering capacity

Woodland

Management concerns: Low strength, sandy textures

12. Houghton-Adrian-Toto Association

Nearly level, very poorly drained soils that formed in organic deposits, organic deposits over outwash, and organic deposits over coprogenic material and marl; on outwash plains, till plains, and moraines

Setting

Composite landform: Outwash plains, till plains, and moraines
Composite slopes: 0 to 1 percent

Composition

Extent of the association in the survey area: 1 percent
Extent of the soils in the association (fig. 13):
Houghton soils—26 percent
Adrian soils—25 percent
Toto soils—24 percent
Soils of minor extent—25 percent

Soil Properties and Qualities

Houghton

Position on the landform: Depressions
Parent material: Organic deposits

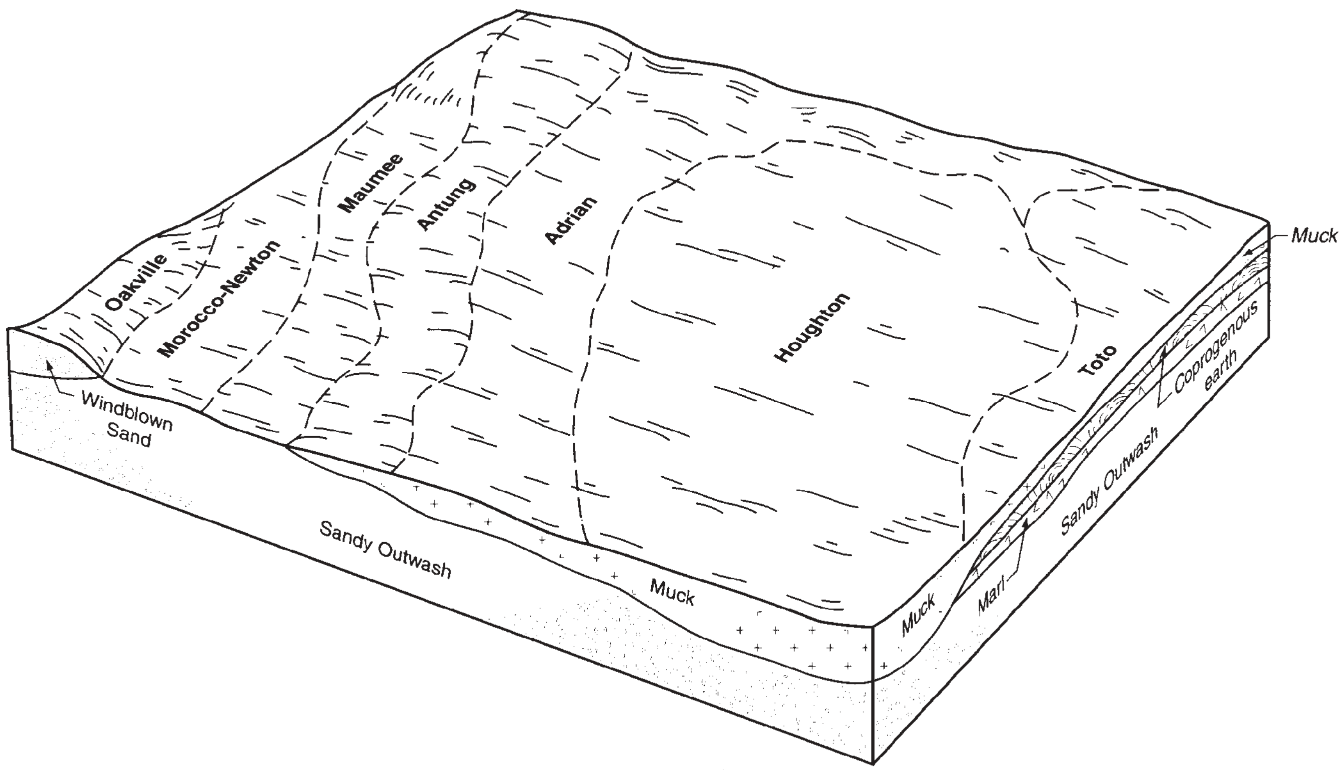


Figure 13.—Typical pattern of soils and underlying material in the Houghton-Adrian-Toto association.

Drainage class: Very poorly drained
Texture of the surface layer: Muck
Slope: 0 to 1 percent

Adrian

Position on the landform: Depressions
Parent material: Organic deposits over outwash
Drainage class: Very poorly drained
Texture of the surface layer: Muck
Slope: 0 to 1 percent

Toto

Position on the landform: Depressions
Parent material: Organic deposits over coprogenous earth, marl, and outwash
Drainage class: Very poorly drained
Texture of the surface layer: Muck
Slope: 0 to 1 percent

Soils of Minor Extent

- Antung, Maumee, and Newton soils in depressions
- Morocco soils on swells
- Oakville soils on hillslopes and knolls

Use and Management

Major use: Cropland

Cropland

Management concerns: Ponding, wetness, wind erosion

Dwellings

Management concerns: Ponding, excess humus

Local roads and streets

Management concerns: Ponding, frost action, subsidence of organic material

Septic tank absorption fields

Management concerns: Ponding, wetness, subsidence of organic material

Woodland

Management concerns: Ponding, wetness, low strength

Formation and Classification of the Soils

This section relates the soils in the survey area to the major factors and processes of soil formation and describes the system of soil classification.

Factors of Soil Formation

Soils form through the physical and chemical weathering of geologic materials. The characteristics of a soil at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil material was deposited and has existed since deposition; the plant and animal life associated with the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the soil material.

Climate (mainly water) and plant and animal life are the active factors of soil formation. These factors act on the parent material that has accumulated through the weathering of rock and slowly change it into a natural body that has genetically related horizons. The effects of climate and plant and animal life are influenced by relief. Because the weather patterns in Pulaski County have been relatively uniform over a long period of time, plants are the major active factor of soil formation. The parent material affects the kind of soil profile that forms. Finally, time is needed for the transformation of the parent material into a soil. Some time is always required for the differentiation of soil horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four.

Parent Material

Parent material is the geologic mass in which a soil forms. It can be consolidated, such as bedrock, or unconsolidated, such as glacial materials, recent alluvium, windblown materials, or lakebed deposits. In Pulaski County, the parent materials are unconsolidated and were deposited by continental glaciers and by meltwater from those glaciers. The parent materials are glacial till, glacial outwash, lacustrine deposits (lakebed materials), recent alluvium, and windblown materials. Thick deposits of organic material also occur. Limestone bedrock is within a depth of 10 feet in the southwestern part of the county. The soils in areas where bedrock is close to the surface did not form from the limestone; rather, they were deposited by continental glaciers. Parent material determines the limits of the chemical and mineralogical composition of the soil. Some of these materials were reworked and redeposited by the subsequent actions of water and wind. Some authorities believe that the most recent glaciers covered the county about 15,000 years ago and finally retreated about 12,000 years ago. Although the parent materials in the county are of similar glacial origin, their properties vary greatly, sometimes within small areas, depending on how the materials were deposited.

Glacial till is material deposited directly by glaciers with little or no water action. It consists of particles of different sizes that are mixed together. The small pebbles in glacial till have sharp corners, indicating that they have not been worn by moving water. Most of the glacial till in Pulaski County is from the Erie lobe, but a small portion is from the Huron-Saginaw lobe. This glacial till is calcareous, has a variety of densities, and is sandy loam, loam, or clay loam. Crosier soils are examples of soils that formed in firm, loamy glacial till. These soils typically are medium textured and have well developed structure.

Glacial outwash material was deposited by moving water from melting glaciers. The size of the particles that make up glacial outwash varies, depending on the velocity of the water that carried the material. Water moving at a high velocity deposited particles heavy enough to fall out of the current, typically boulders, cobbles, or gravel. Water moving more slowly deposited the smaller materials. Clay, silt, and very fine sand were washed downstream. Outwash deposits generally occur as layers of particles of similar size, such as sandy loam, sand, gravel, and other coarse particles. The size of the particles depends on the weather during glacial melt. During periods of warmer weather, more of the glaciers melted and the water moved rapidly; therefore, the larger materials were deposited. During cooler periods, less melting took place and the water moved more slowly; therefore, the smaller materials were deposited. Gilford soils are examples of soils that formed in glacial outwash.

Lacustrine material was deposited by still, ponded, or very slowly moving glacial meltwater. Since the coarser fragments dropped out of the moving water as glacial outwash, only the finer particles, such as very fine sand, silt, and clay, remain to settle in still water. Lacustrine deposits are silty or clayey. They are commonly low and flat on the landscape, but some lacustrine deposits formed on the top of glaciers. Water accumulated in the low areas on top of the glacier and captured the materials blowing over the top of the glacier. When the glacier melted, these deposits settled as hills on the landscape. The soils in Pulaski County that formed in these deposits are medium textured or fine textured. Strole soils are examples of soils that formed in lacustrine materials.

Recent alluvium was deposited by floodwater along present streams. The material varies in texture, depending on the speed of the water from which it was deposited. Abscota and Cohoctah soils are examples of soils that formed in recent alluvium.

Organic material occurs as deposits of plant remains. After the glaciers melted out of the area, water ponded in depressions in kettle lakes on outwash plains, lake plains, and till plains. Grasses and sedges growing around the edges of these lakes eventually died, and their remains accumulated in these depressions. As a result of the wetness and subsequent lack of oxygen, the plant remains decomposed very slowly to an unrecognizable material, labeled as muck. As the ponded areas evolved, water-tolerant trees grew and died, depositing their remains in the water and adding to the accumulation. The ponded areas were eventually filled with organic material. Houghton soils are examples of soils that formed in thick deposits of organic material. Other organic deposits formed depending on the depth of the ponded water. Generally, the organisms in ponded areas are different at different depths. Lakes of medium depth have many species of amphibians, and the products of their existence accumulate as a layer of limnic material called coprogenous earth. This material is olive or green, and it does not absorb water when it is dry. Muskego soils are examples of soils that formed in organic material and a thick layer of coprogenous earth. Deep lakes contained organisms with calcium carbonate exoskeletons or bone structures, and the products of their existence accumulate as a limnic material called marl. Marl is very high in calcium carbonate and has a very high pH. Edwards soils are examples of soils that formed in organic material and a deep layer of marl.

Eolian sand was deposited by wind. This material ranges in size from very fine sand to medium sand. The larger the sand particles, the closer to the source they are deposited. Smaller sand particles are deposited further away from the source. The velocity of the wind also affects the material that is deposited. The more rapid wind velocities carry the larger sand particles further from the source and the smaller sand particles even further. All of Pulaski County has eolian material deposited in the soils. Most of the eolian sand was deposited in shallow lakes. Some was deposited as a result of saltation, which created sand dunes, and the rest formed a thin mantle on the surface of glacial outwash and glacial till soils. Oakville soils are examples of soils that formed in eolian sand on a sand dune.

Plant and Animal Life

Plants have been the principal organisms influencing the formation of the soils in Pulaski County. Bacteria, fungi, soil micro-organisms, and earthworms also have affected the formation of the soils. The chief contribution of plant and animal life to soil formation is the addition of organic material and nitrogen to the soil. The kind of organic material on and in the soil depends on the kinds of native plants that grew on the soil. The remains of these plants accumulated on the surface, decayed, and eventually became soil organic matter. The roots of the plants provided channels for the downward movement of water through the soil and added organic matter as they decayed. Bacteria and soil micro-organisms helped to break down the organic material into plant nutrients.

The native vegetation in Pulaski County was mainly deciduous trees, but a few areas supported prairie grasses. Differences in natural soil drainage and variations in the kind of parent material affected the composition of the vegetative cover. Some somewhat poorly drained soils on till plains, such as Odell soils, formed under prairie grasses. Other well drained upland soils, such as Riddles and Oakville soils, mainly supported a variety of oak, walnut, and hickory. Wet soils, such as Maumee and Rensselaer soils, primarily supported pin oak, black willow, cottonwood, and sycamore. The soils that formed dominantly under forest vegetation generally have less organic matter and are more leached than the soils that formed dominantly under prairie grasses.

Climate

Climate helps to determine the kind of plant and animal life on and in the soil, the amount of water available for the weathering of minerals, the translocation of soil material, and the rate of chemical reaction in the soil. These influences are important, but they affect large areas rather than relatively small areas, such as a county.

The climate in Pulaski County is cold in winter and hot and humid in summer. It is presumably similar to the climate under which the soils formed. The soils in the county differ from soils that formed under a dry, warm climate and from those that formed under a hot, moist climate. The climate is uniform throughout the county. There are no major differences among the soils resulting from any differences in climate.

Relief

Relief, or topography, has markedly affected the soils in Pulaski County through its influence on natural soil drainage, runoff, erosion, plant cover, and soil temperature. Slopes range from nearly level to very steep. Runoff is the most rapid on the steeper slopes. Water is temporarily or permanently ponded in the lower areas.

Natural soil drainage in the county ranges from excessively drained on sand dunes to very poorly drained in depressions filled with organic materials. Through its effect on soil aeration, drainage determines the color of the soil. Water and air move freely through well drained soils but very slowly through very poorly drained soils. In well aerated soils, such as the excessively drained Oakville soils, the iron compounds that give soils their color are brightly colored and oxidized. Antung soils and other poorly aerated, very poorly drained soils are dull gray because the iron has been reduced.

In poorly drained, somewhat poorly drained, moderately well drained, and well drained soils, the depth to the water table and to the reduced gray colors can vary. Well drained soils generally do not have a water table within 40 inches of the surface.

Time

Generally, a long time is required for the processes of soil formation to result in the development of distinct horizons. Differences in the length of time that the parent material has been in place and the amount of disturbance, such as erosion or deposition, are commonly reflected in the degree of profile development.

The soils in Pulaski County range in age from recently deposited (on the flood plains) to approximately 15,000 years old (in the uplands). The glacial deposits in which many of the soils formed have been exposed to the soil-forming processes long enough for the development of distinct horizons. Soils that formed on flood plains are very young because new material is deposited frequently, and the soil-forming process starts again with each disturbance.

Processes of Soil Formation

Several processes have been involved in the formation of the soils in Pulaski County (Franzmeier, 1997; Ruhe, 1956). These processes are additions, such as organic matter; losses, or dissolution, transfer, and removal of compounds, such as calcium carbonate and bases; the liberation and translocation of silicate clay minerals; and transformation, such as reduction and transfer of iron or weathering of silicate clays. In most soils more than one of these processes have helped to differentiate horizons.

Some organic matter has accumulated in the surface layer of all the soils in the county. The content of organic matter is moderate in most of the soils but ranges from very low to very high. Generally, the soils that have the highest content of organic matter, such as Houghton soils, have a thick, dark organic layer at the surface and are very poorly drained.

Carbonates and bases have been leached from the upper horizons of nearly all the soils in Pulaski County. Leaching of carbonates and salts preceded the translocation of silicate clay minerals. Most of the carbonates and the salts have been leached from the A and B horizons of most soils. Leaching is indicated by the absence of carbonates and by an acid reaction.

Clay accumulates in pores and on the faces of structural units along which water moves. The leaching of bases and the subsequent translocation of silicate clays are among the more important processes of horizon differentiation in the county. Miami soils are examples of soils in which translocated silicate clay has accumulated in the Bt horizon.

Gleying, or the reduction and transfer of iron, has occurred in all of the very poorly drained to moderately well drained soils in the county. In these naturally wet soils, this process has significantly affected horizon differentiation. A gray subsoil indicates the reduction and redistribution of an iron oxide. Reduction is commonly accompanied by either a transfer of the iron from the upper to the lower horizons or removal of the iron from the soil profile. Mottles, or redoximorphic features, which occur in soil horizons in which reduction has taken place, indicate the segregation of iron oxide (Birkeland, 1974; Birkeland, 1984; Buol and others, 1980; Franzmeier, 1997).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 4 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, active, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Detailed Soil Map Units

In this section, arranged in alphabetical order, each soil series recognized in the survey area is described. Each series description is followed by descriptions of the associated detailed soil map units.

Characteristics of the soil and the material in which it formed are identified for each soil series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff, 1999). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on the detailed soil maps represents an area on the landscape and consists of one or more soils or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included contrasting soils or miscellaneous areas and their extent within the map unit are listed in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape. A few of the minor components listed in the map unit descriptions are not described elsewhere in this survey. Information regarding these soils is available in the local office of the Natural Resources Conservation Service or can be accessed through the "Official Series Descriptions" link on the USDA-NRCS Soil Survey Division Webpage.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal soil features that may need to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Crosier fine sandy loam, 0 to 1 percent slopes, is a phase of the Crosier series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Maumee-Gilford complex, 0 to 1 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Pits, gravel, is an example.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Abscota Series

The Abscota series consists of very deep, moderately well drained soils on flood plains. These soils formed in sandy alluvium. Permeability is rapid. Slopes range from 0 to 2 percent.

These soils are classified as mixed, mesic Oxyaquic Udipsamments.

Typical Pedon for the Series

Abscota loamy sand, on a convex slope of 2 percent, in a wooded area on a flood plain, in Kent County, Michigan, about 2 miles south of the city of Wyoming; 1,600 feet south and 2,500 feet east of the northwest corner of sec. 12, T. 5 N., R. 12 W.; USGS Cutlerville topographic quadrangle; latitude 42 degrees 50 minutes 14 seconds north and longitude 85 degrees 40 minutes 30 seconds west; NAD 1927:

A—0 to 5 inches; very dark grayish brown (10YR 3/2) loamy sand, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; many roots; slightly acid; abrupt wavy boundary.

Bw1—5 to 11 inches; yellowish brown (10YR 5/4) loamy sand; weak coarse subangular blocky structure; very friable; common roots; slightly acid; clear smooth boundary.

Bw2—11 to 14 inches; light yellowish brown (10YR 6/4) loamy sand; weak medium subangular blocky structure; very friable; common roots; slightly acid; clear smooth boundary.

C1—14 to 28 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; few roots; slightly acid; clear smooth boundary.

C2—28 to 38 inches; pale brown (10YR 6/3) sand; single grain; loose; common coarse faint yellowish brown (10YR 5/4) masses of iron oxide in the matrix; few roots; slightly acid; clear smooth boundary.

C3—38 to 48 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; many coarse very dark grayish brown organic stains; slightly acid; clear smooth boundary.

C4—48 to 52 inches; yellowish brown (10YR 5/6) sand; single grain; common coarse distinct brown (10YR 5/3) masses of iron oxide in the matrix; slightly alkaline; abrupt smooth boundary.

C5—52 to 60 inches; dark grayish brown (10YR 4/2) sand; single grain; loose; few medium prominent yellowish brown (10YR 5/8) masses of iron oxide in the matrix; slightly alkaline.

Range in Characteristics

The content of rock fragments, dominantly gravel, ranges from 0 to 10 percent in the A and B horizons and from 0 to 25 percent in the C horizons. Depth to redoximorphic features ranges from 40 to more than 60 inches. The soil is saturated with water in at least one layer within 40 inches of the mineral surface for 1 month per year in 6 or more out of 10 years. There is an irregular decrease in organic carbon with increasing depth.

The A horizon has value of 2 to 4 and chroma of 1 to 3. It is loamy sand, sandy loam, loamy fine sand, fine sandy loam, loam, or sand. Reaction is slightly acid or neutral. Some pedons have an Ap horizon. This horizon is 5 to 10 inches thick.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6. It is sand, loamy fine sand, or loamy sand. Reaction ranges from slightly acid to slightly alkaline.

The C horizon has hue of 7.5YR or 10YR, value of 3 to 7, and chroma of 2 to 6. It is dominantly fine sand,

sand, coarse sand, gravelly coarse sand, or gravelly sand. In some pedons the upper part of the C horizon is loamy sand or loamy fine sand. Gravelly coarse sand is common below a depth of 50 inches. Reaction ranges from slightly acid to moderately alkaline.

AadAK—Abscota fine sandy loam, 0 to 2 percent slopes, occasionally flooded, brief duration

Setting

Landform: Natural levees or backlands on flood plains
Position on the landform: Swells

Average Composition of Components

Abscota and similar soils: 80 percent
Ceresco and similar soils: 7 percent
Eel and similar soils: 7 percent
Algansee and similar soils: 6 percent

Properties and Qualities of the Abscota Soil

Parent material: Sandy alluvium
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections of this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Ackerman Series

The Ackerman series consists of very deep, very poorly drained soils on outwash plains and in old lakebeds. These soils formed in a thin layer of highly decomposed organic material and a thin layer of coprogenous material underlain by fine sand. Permeability is slow in the coprogenous material and rapid in the underlying sandy material. Slopes are 0 to 1 percent.

These soils are classified as sandy, mixed, mesic Histic Humaquepts.

Typical Pedon for the Series

Ackerman muck, on a slope of less than 1 percent, in a cultivated field in White County, Indiana; 140 feet south and 1,000 feet west of the northeast corner of sec. 28, T. 28 N., R. 2 W.; USGS Idaville topographic quadrangle; latitude 40 degrees 51 minutes 13.1 seconds north and longitude 86 degrees 38 minutes 31.4 seconds west; NAD 1927:

Op—0 to 8 inches; muck, black (N 2/0) broken face and rubbed, very dark gray (10YR 3/1) dry; less than 5 percent fiber, a trace rubbed; moderate fine granular structure; friable; about 40 percent mineral content; neutral; abrupt irregular boundary.

Lco—8 to 14 inches; gray (5Y 5/1), coprogenous silty clay loam; moderate medium and thick platy structure; firm; many medium distinct yellowish brown (10YR 5/4) masses of iron oxide accumulation in the matrix; areas of iron oxide accumulation around many root channels are strong brown (7.5YR 5/6), and many small root channels are filled with material from the surface layer; common cracks 1 to 2 inches wide filled with material from the surface layer; neutral; abrupt smooth boundary.

Cg—14 to 26 inches; light brownish gray (10YR 6/2) fine sand; few medium distinct brown (7.5YR 4/4) masses of iron oxide accumulation in the matrix; single grain; loose; neutral; clear wavy boundary.

C—26 to 60 inches; brownish yellow (10YR 6/8) fine sand; single grain; loose; strongly effervescent; moderately alkaline.

Range in Characteristics

The combined thickness of the muck and coprogenous material ranges from 10 to 30 inches. The thickness of the muck does not exceed 16 inches.

The Op horizon is black (10YR 2/1 or N 2/0). The mineral content ranges from 10 to 60 percent. Some pedons have an Oa horizon. This horizon is similar to the Op horizon.

The Lco horizon has hue of 10YR to 5Y, value of 2 to 5, and chroma of 1 to 3. It is coprogenous silt loam or coprogenous silty clay loam. Reaction ranges from moderately acid to slightly alkaline. Free carbonates occur in some pedons. This horizon has platy structure or is massive. It has slightly plastic consistence and shrinks upon drying to form hard clods that are difficult to re-wet.

The C horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 8 or less. It is very fine sand, fine sand, sand, or loamy sand.

AatAN—Ackerman muck, drained, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Ackerman and similar soils: 85 percent
Moston and similar soils: 10 percent
Antung and similar soils: 5 percent

Properties and Qualities of the Ackerman Soil

Parent material: Herbaceous organic material over coprogenous material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 7.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

AatAU—Ackerman muck, undrained, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Ackerman and similar soils: 80 percent
Moston and similar soils: 10 percent
Antung and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Ackerman Soil

Parent material: Herbaceous organic material over coprogenous material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 7.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Adrian Series

The Adrian series consists of very deep, very poorly drained soils on outwash plains, lake plains and terraces, flood plains, moraines, and till plains. These soils formed in herbaceous organic material and in the underlying sandy deposits. Permeability is moderately slow to moderately rapid in the organic material and rapid in the sandy material. Slopes are 0 to 1 percent.

These soils are classified as sandy or sandy-skeletal, mixed, euic, mesic Terric Haplosaprists.

Typical Pedon for the Series

Adrian muck, on a slope of less than 1 percent, in an area of marsh vegetation in Gratiot County, Michigan, about 1 1/2 miles southeast of the village of Ashley; 2,040 feet north and 100 feet east of the southwest corner of sec. 16, T. 9 N., R. 1 W.; USGS Ashley topographic quadrangle; latitude 43 degrees 10 minutes 2.4 seconds north and longitude 84 degrees 26 minutes 50.6 seconds west; NAD 1927:

Oa1—0 to 16 inches; muck, black (10YR 2/1) broken face, black (N 2/0) rubbed; about 12 percent fiber, less than 5 percent rubbed; moderate medium granular structure; primarily herbaceous fibers; neutral (pH 7.0 in water); abrupt wavy boundary.

Oa2—16 to 20 inches; muck, black (10YR 2/1) broken face, very dark brown (10YR 2/2) rubbed; about 15 percent fiber, less than 5 percent rubbed; weak coarse subangular blocky structure; primarily herbaceous fibers; slightly acid (pH 6.5 in water); gradual wavy boundary.

Oa3—20 to 27 inches; muck, black (10YR 2/1) broken face, black (10YR 2/1) rubbed; about 12 percent fiber, less than 5 percent rubbed; weak thick platy structure; primarily herbaceous fibers; moderately acid (pH 6.0 in water); gradual wavy boundary.

Oa4—27 to 34 inches; muck, black (10YR 2/1) broken face, black (10YR 2/1) rubbed; about 12 percent fiber, less than 5 percent rubbed; massive;

primarily herbaceous fibers; strongly acid (pH 5.5 in water); abrupt smooth boundary.

Cg1—34 to 60 inches; gray (10YR 5/1) sand; single grain; loose; common medium prominent light olive brown (2.5Y 5/4) masses of iron oxide accumulation in the matrix; slightly alkaline; clear wavy boundary.

Cg2—60 to 80 inches; dark gray (2.5Y 4/1) fine sand; single grain; loose; moderately alkaline; strongly effervescent.

Range in Characteristics

The difference between mean summer and mean winter soil temperature is 17 to 25 degrees F or more. The depth to the sandy C horizon ranges from 16 to 51 inches. The organic materials are derived primarily from herbaceous plants, but some layers contain as much as 50 percent material of wood origin.

The surface tier has hue of 10YR to 5YR or is neutral in hue. It has value of 2 and chroma of 0 to 3. It is dominantly muck (sapric material), but some pedons have mucky peat (hemic material). Some pedons have a thin mat (1 to 4 inches thick) of sphagnum moss on the surface. Reaction ranges from strongly acid to neutral.

The subsurface and bottom tiers have hue of 10YR to 5YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 3. Some pedons have thin layers (less than 10 inches thick) of mucky peat (hemic material), and some have thin layers (less than 5 inches thick) of peat (fibric material). In some pedons a layer of sedimentary peat 1 to 2 inches thick is above the C horizon. Reaction ranges from strongly acid to neutral.

The C or Cg horizon has hue of 5YR to 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 4. It is sand, coarse sand, fine sand, or loamy sand or the gravelly or very gravelly analogs of these textures. The content of rock fragments ranges from 0 to 60 percent. Strata of finer textures occur in some pedons. Reaction ranges from slightly acid to moderately alkaline.

AbhAN—Adrian muck, drained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, outwash plains, and flood plains
Position on the landform: Depressions

Average Composition of Components

Adrian and similar soils: 75 percent
Antung and similar soils: 10 percent
Edwards and similar soils: 6 percent
Houghton and similar soils: 6 percent
Muskego and similar soils: 3 percent

Properties and Qualities of the Adrian Soil

Parent material: Herbaceous organic material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 15.1 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

AbhAU—Adrian muck, undrained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, outwash plains, and flood plains
Position on the landform: Depressions

Average Composition of Components

Adrian and similar soils: 75 percent
Edwards and similar soils: 8 percent
Houghton and similar soils: 7 percent
Muskego and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Adrian Soil

Parent material: Herbaceous organic material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 15.1 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Antung Series

The Antung series consists of very deep, very poorly drained soils on outwash plains, lake plains and terraces, flood plains, moraines, and till plains. These soils formed in a thin layer of herbaceous organic material overlying sandy deposits. Permeability is moderately slow to moderately rapid in the organic material and rapid in the sandy material.

These soils are classified as sandy, mixed, mesic Histic Humaquepts.

Typical Pedon for the Series

Antung muck (fig. 14), on a slope of less than 1 percent, in a cultivated field, in Pulaski County, Indiana; 2,260 feet east and 95 feet north of the southwest corner of sec. 34, T. 31 N., R. 2 W.; USGS Ripley topographic quadrangle; latitude 41 degrees 5 minutes 5.1 seconds north and longitude 86 degrees 37 minutes 58.3 seconds west; NAD 1927:

Op—0 to 9 inches; muck, black (N 2.5/0) broken face and rubbed; a trace of fiber unrubbed and rubbed; moderate medium granular structure; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

Oa—9 to 12 inches; muck, black (N 2.5/0) broken face and rubbed; a trace of fiber unrubbed and rubbed; weak medium subangular blocky structure; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

Cg1—12 to 28 inches; light brownish gray (10YR 6/2) sand; many medium faint pale brown (10YR 6/3) and few medium prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; single grain; loose; slightly effervescent; moderately alkaline; clear wavy boundary.

Cg2—28 to 48 inches; light brownish gray (10YR 6/2) sand; few medium prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; single grain; loose; slightly effervescent; moderately alkaline; clear wavy boundary.

Cg3—48 to 80 inches; grayish brown (10YR 5/2) coarse sand; single grain; loose; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the sandy C horizon ranges from 7 to 16 inches. The organic materials are derived primarily from herbaceous plants, but some layers contain material of woody origin.

The Op horizon has hue of 10YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 2. It is dominantly muck (sapric material). Reaction is slightly acid or neutral. Some pedons do not have an Op horizon.

The Oa horizon has hue of 10YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 3. Reaction is slightly acid or neutral.

The Cg horizon has hue of 10YR or 2.5YR, value of 4 to 6, and chroma of 1 or 2. It is sand, coarse sand, fine sand, or loamy sand or the gravelly analogs of these textures. The content of rock fragments ranges from 0 to 25 percent. Reaction ranges from neutral to moderately alkaline.

ApuAN—Antung muck, drained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, outwash plains, and flood plains
Position on the landform: Depressions

Average Composition of Components

Antung and similar soils: 75 percent
Adrian and similar soils: 15 percent
Ackerman and similar soils: 5 percent
Madaus and similar soils: 5 percent

Properties and Qualities of the Antung Soil

Parent material: Herbaceous organic material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 7.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section

- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

ApuAU—Antung muck, undrained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, outwash plains, and flood plains
Position on the landform: Depressions

Average Composition of Components

Antung and similar soils: 75 percent
Adrian and similar soils: 10 percent
Ackerman and similar soils: 5 percent
Madaus and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Antung Soil

Parent material: Herbaceous organic material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 7.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Brady Series

The Brady series consists of very deep, somewhat poorly drained soils on outwash plains, valley trains, terraces, and lake plains. These soils formed in loamy outwash materials. Permeability is moderately rapid. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, active, mesic Aquollic Hapludalfs.

Typical Pedon for the Series

Brady sandy loam, on a slope of 1 percent, in a cultivated field, in Eaton County, Michigan, about 3 miles southwest of the town of Charlotte; 500 feet north and 800 feet east of the center of sec. 33, T. 2 N., R. 5 W.; USGS Chester topographic quadrangle; latitude 42 degrees 31 minutes 8 seconds north and longitude 84 degrees 54 minutes 8.4 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

E—9 to 13 inches; grayish brown (10YR 5/2) sandy loam; weak coarse granular structure; friable; few fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; slightly acid; clear wavy boundary.

BE—13 to 23 inches; brown (10YR 5/3) sandy loam; weak coarse subangular blocky structure; friable; many medium distinct gray (10YR 5/1) iron oxide depletions in the matrix; moderately acid; clear wavy boundary.

Bt—23 to 37 inches; dark yellowish brown (10YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds and bridging sand grains; very dark grayish brown (10YR 3/2) sandy loam wormcasts and fillings in root channels; many medium distinct gray (10YR 5/1) iron oxide depletions in the matrix; yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; about 6 percent gravel; moderately acid; abrupt irregular boundary.

BC—37 to 56 inches; brown (7.5YR 4/4) loamy sand; weak coarse subangular blocky structure; very friable; few thin ($^1/_8$ inch to 2 inches thick) discontinuous brown (7.5YR 4/4) sandy loam layers; few medium distinct gray (10YR 5/1) iron oxide depletions in the matrix; yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; neutral; abrupt irregular boundary.

2C—56 to 80 inches; brown (10YR 5/3) gravelly coarse sand and coarse sand; single grain; loose; common medium distinct gray (10YR 5/1) iron oxide depletions in the matrix; about 15 percent gravel; slightly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 34 to 56 inches. The depth to free carbonates ranges from 40 to 70 inches. Reaction ranges from neutral to strongly acid in the upper part of the profile and from neutral to moderately alkaline in the lower part. The content of rock fragments ranges from 0 to 25 percent, by volume, in the upper part of the profile and from 10 to 55 percent in the 2C horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. It is dominantly sandy loam, fine sandy loam, loamy fine sand, or loamy sand, but loam and silt loam are included in the range.

The E or BE horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is dominantly sandy loam, fine sandy loam, loamy fine sand, or loamy sand, but loam and silt loam are included in the range.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It commonly has mottles throughout with chroma of 2 or less and value of 4 or more. This horizon is dominantly sandy loam or gravelly sandy loam, but sandy clay loam, gravelly sandy clay loam, and clay loam are included in the range. Where the texture is sandy clay loam or clay loam, the layer is less than 8 inches thick.

The BC horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 6. It is sandy loam or loamy sand.

The 2C horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 4. It is gravelly coarse sand, coarse sand, sand, gravelly sand, very gravelly sand, or stratified coarse sand and gravel. The content of rock fragments ranges from 10 to 55 percent by volume. Reaction ranges from neutral to moderately alkaline.

BrvA—Brady fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Swells

Average Composition of Components

Brady and similar soils: 85 percent
Bronson and similar soils: 5 percent
Gilford and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Brady Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 8.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Brems Series

The Brems series consists of very deep, moderately well drained soils on outwash plains. These soils formed in acid sandy outwash. Permeability is rapid. Slopes range from 0 to 4 percent.

These soils are classified as mixed, mesic Aquic Udipsamments.

Typical Pedon for the Series

Brems loamy sand, 0 to 1 percent slopes, in a cultivated field, in Elkhart County, Indiana; 830 feet north and 1,920 feet west of the southeast corner of sec. 10, T. 38 N., R. 5 E.; USGS Elkhart topographic quadrangle; latitude 41 degrees 45 minutes 20 seconds north and longitude 85 degrees 56 minutes 6 seconds west; NAD 1927:

Ap—0 to 9 inches; dark brown (10YR 3/3) loamy sand, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; common very fine and fine roots throughout; slightly acid; abrupt smooth boundary.

Bw1—9 to 18 inches; dark brown (7.5YR 4/4) loamy sand; weak fine subangular blocky structure; very friable; few very fine and fine roots throughout; few fine tubular pores; moderately acid; gradual wavy boundary.

Bw2—18 to 27 inches; strong brown (7.5YR 4/6) loamy sand; weak fine subangular blocky structure; very friable; few very fine and fine roots throughout; few fine tubular pores; strongly acid; clear wavy boundary.

Bw3—27 to 33 inches; strong brown (7.5YR 4/6) sand; weak medium subangular blocky structure; very friable; few medium distinct brown (7.5YR 4/4) masses of iron oxide accumulation in the matrix; common fine distinct brown (10YR 5/3) iron oxide depletions in the matrix; few medium dark brown (7.5YR 3/4) masses of iron-manganese oxide accumulation throughout; very strongly acid; clear wavy boundary.

Bw4—33 to 46 inches; yellowish brown (10YR 5/6) sand; single grain; loose; common coarse distinct brown (7.5YR 4/4) masses of iron oxide accumulation in the matrix; common fine distinct light brownish gray (10YR 6/2) and pale brown

(10YR 6/3) iron oxide depletions in the matrix; few medium dark brown (7.5YR 3/4) masses of iron-manganese oxide accumulation throughout; very strongly acid; clear wavy boundary.

Bw5—46 to 56 inches; yellowish brown (10YR 5/4 and 5/6) sand; single grain; loose; common coarse distinct brown (7.5YR 4/4) masses of iron oxide accumulation in the matrix; common medium distinct light brownish gray (10YR 6/2) iron oxide depletions in the matrix; few medium dark brown (7.5YR 3/4) masses of iron-manganese oxide accumulation throughout; strongly acid; clear wavy boundary.

Bw6—56 to 66 inches; yellowish brown (10YR 5/4 and 5/6) sand; single grain; loose; many medium distinct strong brown (7.5YR 4/6) masses of iron oxide accumulation in the matrix; many medium distinct light gray (10YR 7/2) iron depletions in the matrix; few medium dark brown (7.5YR 3/4) masses of iron-manganese oxide accumulation throughout; strongly acid; clear wavy boundary.

Bw7—66 to 72 inches; yellowish brown (10YR 5/4) and strong brown (7.5YR 4/6) sand; single grain; common fine distinct strong brown (7.5YR 4/6) masses of iron oxide accumulation in the matrix; common fine distinct light brownish gray (10YR 6/2) iron oxide depletions in the matrix; strongly acid; clear wavy boundary.

BC—72 to 80 inches; yellowish brown (10YR 5/4) sand; common fine distinct light brownish gray (10YR 6/2) iron oxide depletions in the matrix; strongly acid.

Range in Characteristics

The depth to the base of soil development ranges from 40 to more than 80 inches. Redoximorphic features occur between depths of 24 and 40 inches. The content of rock fragments ranges from 0 to 10 percent throughout the profile. The particle-size control section averages more than 25 percent medium and coarser sand.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is loamy sand, loamy fine sand, sand, or fine sand. Reaction ranges from neutral to strongly acid, depending upon liming history.

Some pedons have an E horizon. This horizon has characteristics similar to those of the A horizon, but it has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is loamy sand, loamy fine sand, sand, or fine sand. Reaction ranges from moderately acid to very strongly acid.

The BC and C horizons, if they occur, have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. They are loamy sand, sand, loamy fine sand, or fine sand. Reaction is dominantly strongly acid but ranges to slightly acid.

BstA—Brems loamy fine sand, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Swells

Average Composition of Components

Brems and similar soils: 75 percent
Denham and similar soils: 20 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Brems Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

BstB—Brems loamy fine sand, 1 to 4 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Swells

Average Composition of Components

Brems and similar soils: 75 percent
Denham and similar soils: 10 percent
Morocco and similar soils: 10 percent
Winamac and similar soils: 5 percent

Properties and Qualities of the Brems Soil

Parent material: Sandy outwash
Slope: 1 to 4 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

BswA—Brems-Morocco loamy fine sands, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Swells

Average Composition of Components

Brems and similar soils: 50 percent
Morocco and similar soils: 40 percent
Denham and similar soils: 5 percent
Newton and similar soils: 5 percent

Properties and Qualities of the Brems Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.5 inches to a depth of 60 inches

Properties and Qualities of the Morocco Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 5.0 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Bronson Series

The Bronson series consists of very deep, moderately well drained soils on outwash plains, valley trains, and low-lying moraines. These soils formed in loamy and sandy materials overlying loamy sand or gravelly sand deposits. Permeability is moderately rapid. Slopes range from 0 to 4 percent.

These soils are classified as coarse-loamy, mixed, active, mesic Aquic Hapludalfs.

Typical Pedon for the Series

Bronson sandy loam, on a slope of 2 percent, in a cultivated field at an elevation of about 751 feet, in Van Buren County, Michigan, about 3 miles west of the village of Lawton; 2,568 feet north and 1,290 feet east of the southwest corner of sec. 34, T. 3 S., R. 14 W.; USGS Pawpaw topographic quadrangle; latitude 42 degrees 9 minutes 51.95 seconds north and longitude 85 degrees 55 minutes 52.67 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sandy loam, pale brown (10YR 6/3) dry; moderate medium subangular blocky structure; friable; about 3 percent gravel; common roots; slightly acid; abrupt smooth boundary.

BE—9 to 20 inches; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; friable; about 2 percent gravel; common roots; strongly acid; abrupt smooth boundary.

Bt1—20 to 29 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium subangular blocky structure; friable; few thin clay films on surface of peds; about 3 percent gravel; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; moderately acid; abrupt wavy boundary.

Bt2—29 to 43 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common thin clay films on surface of peds; about 8 percent gravel; common coarse distinct gray (10YR 5/1) iron oxide depletions in the matrix; moderately acid; clear wavy boundary.

2BC—43 to 56 inches; yellowish brown (10YR 5/4) loamy sand; weak fine subangular blocky structure; very friable; about 10 percent gravel; moderately acid; clear smooth boundary.

2C—56 to 80 inches; pale brown (10YR 6/3) sand and coarse sand; single grain; loose; about 10 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon and the depth to free carbonates range from 40 to 70 inches.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is loamy sand, fine sandy loam, or sandy loam. Pedons in uncultivated areas have an A horizon. This horizon is 2 to 6 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The content of rock fragments ranges from 2 to 14 percent by volume. Reaction ranges from strongly acid to neutral.

Some pedons have an E horizon. This horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 4. It is sand, loamy sand, or sandy loam. It is as much as 8 inches thick. The content of rock fragments ranges from 2 to 14 percent by volume. Reaction ranges from strongly acid to neutral.

The BE horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6. It is loamy sand or sandy loam. The content of rock fragments ranges from 2 to 14 percent by volume. Reaction ranges from strongly acid to neutral.

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 3 to 6. It is sandy loam, sandy clay loam, gravelly sandy loam, or gravelly sandy clay loam. It averages between 10 and 20 percent clay and contains less than 50 percent fine sand and very fine sand. In some pedons the lower part is stratified with bands ($^1/_8$ inch to 4 inches thick) of sandy loam separated by sand or loamy sand. The content of rock fragments ranges from 2 to 25 percent by volume. Reaction ranges from strongly acid to neutral.

The 2BC horizon has hue of 10YR or 7.5YR, value of 3 to 6, and chroma of 3 or 4. It is gravelly loamy sand or loamy sand. The content of rock fragments ranges from 2 to 25 percent by volume. Reaction ranges from moderately acid to neutral.

The 2C horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or 3. It is dominantly sand or gravelly sand, but very gravelly coarse sand and coarse sand are included in the range. The content of rock fragments ranges from 10 to 50 percent. Reaction is slightly alkaline or moderately alkaline.

BupB—Bronson fine sandy loam, 1 to 4 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Swells

Average Composition of Components

Bronson and similar soils: 70 percent
Oshtemo and similar soils: 20 percent
Brady and similar soils: 10 percent

Properties and Qualities of the Bronson Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Brookston Series

The Brookston series consists of very deep, poorly drained soils in depressions on till plains and moraines. These soils formed in as much as 20 inches of silty material and the underlying loamy glacial till. Permeability is moderate in the subsoil and moderately slow in the underlying material. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, superactive, mesic Typic Argiaquolls.

Typical Pedon for the Series

Brookston loam, on a concave slope of 1 percent, in a cultivated field, in Elkhart County, Indiana, about 2 miles north and $^1/_2$ mile east of Nappanee; 1,257 feet north and 2,238 feet east of the southwest corner of sec. 18, T. 35 N., R. 5 E.; USGS Nappanee East topographic quadrangle; latitude 41 degrees 28 minutes 57 seconds north and longitude 85 degrees 59 minutes 44 seconds west; NAD 1927:

Ap1—0 to 5 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; common very fine and fine roots throughout; common very fine and fine low-continuity interstitial and tubular pores; 1 percent gravel; neutral; abrupt smooth boundary.

Ap2—5 to 9 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; weak coarse granular structure; firm; common very fine and fine roots throughout; common very fine and fine low-continuity interstitial and tubular pores; 1 percent gravel; slightly acid; abrupt smooth boundary.

Btg1—9 to 16 inches; very dark gray (10YR 3/1) clay loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; friable; common very fine and fine roots throughout; common very fine and fine moderate-continuity interstitial and tubular pores; common faint very dark gray (10YR 3/1) clay films on faces of peds; 1 percent gravel; neutral; clear wavy boundary.

Btg2—16 to 25 inches; dark gray (10YR 4/1) clay loam; moderate medium subangular blocky structure; firm; common very fine and fine roots throughout; common very fine and fine moderate-continuity interstitial and tubular pores; many faint dark gray (10YR 4/1) clay films on faces of peds; common fine and medium distinct dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in the matrix; 1 percent gravel; neutral; clear wavy boundary.

Btg3—25 to 38 inches; grayish brown (10YR 5/2) clay loam; weak medium prismatic structure; firm; common very fine and fine roots between peds; common very fine and fine moderate-continuity interstitial and tubular pores; many distinct dark gray (10YR 4/1) clay films on faces of peds; many fine and medium distinct dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in the matrix; about 30 percent sand; 2 percent gravel; neutral; gradual wavy boundary.

Bt—38 to 48 inches; brown (10YR 5/3) loam; moderate very coarse prismatic structure parting to weak medium subangular blocky; firm; many distinct gray (10YR 5/1) clay films on faces of peds; many fine and medium distinct dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in the matrix; about 47 percent sand; 2 percent gravel; slightly alkaline; gradual wavy boundary.

BC1—48 to 58 inches; dark yellowish brown (10YR 4/4) loam; moderate very coarse prismatic structure parting to weak medium subangular blocky; firm; many distinct gray (10YR 5/1) clay films on vertical faces of peds; many fine and medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; 1 percent gravel; slightly alkaline; gradual wavy boundary.

BC2—58 to 68 inches; dark yellowish brown (10YR 4/4) loam; moderate very coarse prismatic structure parting to weak medium subangular blocky; firm; many distinct gray (10YR 5/1) clay films on vertical faces of peds; many fine and medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; strongly effervescent on prism faces; slightly effervescent within prisms; 1 percent gravel; moderately alkaline; gradual wavy boundary.

Ck—68 to 80 inches; yellowish brown (10YR 5/4) loam; massive; firm; few distinct continuous gray (10YR 6/1) carbonate coats in cracks; 1 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 30 to 70 inches. The depth to free carbonates ranges from 40 to 70 inches. The particle-size control section averages 25 to 35 percent clay and 15 to 40 percent fine sand or coarser. The sand fraction of the particle-size control section averages less than 60 percent medium sand or coarser. The thickness of the mollic epipedon ranges from 10 to 20 inches. Some pedons have a silty mantle as much as 20 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is silty clay loam, clay loam, silt loam, mucky silt loam, or loam. The content of rock fragments ranges from 0 to 5 percent. Reaction is slightly acid or neutral.

The Bt horizons have hue of 10YR, 2.5Y, or 5Y or are neutral in hue. They have value of 4 to 6 and chroma of 0 to 6. Value of 3 may occur in the horizon immediately below the A horizon. The Bt horizons are silty clay loam, clay loam, or loam. Some pedons have a BA or AB horizon. This horizon is silt loam. The content of rock fragments ranges from 0 to 11 percent. Reaction ranges from slightly acid to slightly alkaline.

The BC horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 4. The texture is loam or fine sandy loam. The clay content ranges from 12 to 25 percent. Reaction ranges from slightly acid in the upper part to moderately alkaline in the lower part. The content of rock fragments ranges from 0 to 11 percent. Free calcium carbonates are in the lower part of the horizon.

The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 to 4, or it is neutral in hue and has chroma of 0. It is loam or fine sandy loam. The content of rock fragments ranges from 0 to 11 percent. The clay content ranges from 10 to 20 percent, and the sand content averages less than 60 percent. Reaction is slightly alkaline or moderately alkaline. Free calcium carbonates are in the horizon, and the calcium carbonate equivalent ranges from 15 to 35 percent.

BuuA—Brookston loam, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Depressions

Average Composition of Components

Brookston and similar soils: 80 percent
Crosier and similar soils: 8 percent
Rensselaer and similar soils: 8 percent
Goodell and similar soils: 4 percent

Properties and Qualities of the Brookston Soil

Parent material: Fine-loamy till
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 9.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

BuzA—Brookston-Navunon loams, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Depressions

Average Composition of Components

Brookston and similar soils: 55 percent
Navunon and similar soils: 37 percent
Gilford and similar soils: 5 percent
Monon and similar soils: 3 percent

Properties and Qualities of the Brookston Soil

Parent material: Fine-loamy till
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 9.7 inches to a depth of 60 inches

Properties and Qualities of the Navunon Soil

Parent material: Fine-loamy till
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: 40 to 80 inches to bedrock (lithic)
Drainage class: Poorly drained
Available water capacity: About 6.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Budd Series

The Budd series consists of very deep, somewhat poorly drained soils on till plains. These soils formed in loamy outwash overlying loamy till. Permeability is moderately rapid in the outwash material and slow in the underlying glacial till. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, active, mesic Aquollic Hapludalfs.

Typical Pedon for the Series

Budd fine sandy loam, on a slope of 1 percent, in a cultivated field at an elevation of 702 feet, in Pulaski County, Indiana, about 3 miles south of Winamac; 1,540 feet east and 2,500 feet south of the northwest corner of sec. 36, T. 30 N., R. 2 W.; USGS Winamac topographic quadrangle; latitude 41 degrees 0 minutes 16.8 seconds north and longitude 86 degrees 35 minutes 48.8 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark brown (10YR 2/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine and fine roots throughout; few very fine and fine interstitial and tubular pores; slightly acid; abrupt smooth boundary.

E—9 to 15 inches; brown (10YR 5/3) fine sandy loam; weak medium subangular blocky structure; very friable; few very fine and fine roots throughout; few very fine and fine interstitial and tubular pores; few fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; few fine faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; about 5 percent gravel; slightly acid; clear wavy boundary.

Bt1—15 to 21 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots throughout; few very fine and fine interstitial and tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; about 5 percent gravel; neutral; clear wavy boundary.

Bt2—21 to 30 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; about 5 percent gravel; neutral; clear wavy boundary.

BC—30 to 38 inches; yellowish brown (10YR 5/4) sandy loam; weak coarse subangular blocky structure; friable; many coarse prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; many coarse distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; about 5 percent gravel; neutral; clear wavy boundary.

C1—38 to 46 inches; yellowish brown (10YR 5/4), stratified sandy loam, loamy sand, and sand; massive; very friable; many coarse prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; many coarse distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; about 5 percent gravel; strongly effervescent; slightly alkaline; clear wavy boundary.

C2—46 to 52 inches; yellowish brown (10YR 5/4), stratified silt loam, very fine sand, and sand; massive; friable; many coarse prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; many coarse distinct gray (10YR 6/1) iron oxide depletions in the matrix; strongly effervescent; slightly alkaline; clear wavy boundary.

2C3—52 to 80 inches; brown (10YR 5/3) loam; massive; firm; many coarse distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; many coarse distinct gray (10YR 5/1) iron oxide depletions in the matrix; about 8 percent gravel and cobbles; strongly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 25 to 50 inches. The depth to free carbonates ranges from 35 to 58 inches. The depth to loam or fine sandy loam till ranges from 40 to 70 inches. Reaction ranges from neutral to strongly acid. The content of rock fragments ranges from 0 to 20 percent, by volume, throughout the particle-size control section.

The Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. It is dominantly sandy loam, fine sandy loam, loamy fine sand, or loamy sand, but the range includes loam.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is dominantly sandy loam, fine sandy loam, loamy fine sand, or loamy sand, but the range includes loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It has mottles throughout with chroma of 2 or less and value of 4 or more. It commonly is sandy loam or fine sandy loam, but the range includes gravelly sandy loam, sandy clay loam, gravelly sandy clay loam, and clay loam. Where the texture is sandy clay loam or clay loam, the layer is less than 8 inches thick.

The BC horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 6. It is sandy loam or loamy sand.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 4. It is sandy loam, loamy sand, sand, very fine sand, gravelly sand, gravelly loamy sand, or silt loam. The content of rock fragments ranges from 0 to 20 percent by volume. Reaction ranges from neutral to moderately alkaline.

The 2C horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 4. It is loam or fine sandy loam with 10 to 25 percent clay and 35 to 70 percent sand. Reaction is slightly alkaline or moderately alkaline.

BwfA—Budd-Brady fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Till plains and outwash plains
Position on the landform: Swells

Average Composition of Components

Budd and similar soils: 45 percent
Brady and similar soils: 35 percent
Morocco and similar soils: 10 percent
Goodell and similar soils: 5 percent
Selfridge and similar soils: 5 percent

Properties and Qualities of the Budd Soil

Parent material: Coarse-loamy outwash over loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 7.7 inches to a depth of 60 inches

Properties and Qualities of the Brady Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 8.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Chelsea Series

The Chelsea series consists of very deep, excessively drained soils on till plains and outwash plains. These soils formed in eolian sand or sand reworked by wind. Permeability is rapid. Slopes range from 5 to 18 percent.

These soils are classified as mixed, mesic Lamellic Udipsamments.

Typical Pedon for MLRA 98

Chelsea fine sand, on a convex slope of about 7 percent, in a wooded area in White County, Indiana, about 3 miles south and 1$^1/_2$ miles east of Headlee; 2,610 feet east and 20 feet south of the northwest corner of sec. 27, T. 28 N., R. 2 W.; USGS Idaville topographic quadrangle; latitude 40 degrees 51 minutes 16.08 seconds north and longitude 86 degrees 37 minutes 43.21 seconds west; NAD 1927:

A—0 to 5 inches; dark brown (10YR 3/3) fine sand, grayish brown (10YR 5/2) dry; weak medium granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

Bw—5 to 26 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; few fine roots; moderately acid; clear irregular boundary.

E—26 to 37 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; few fine roots; moderately acid; abrupt wavy boundary.

E&Bt—37 to 80 inches; yellowish brown (10YR 5/4) fine sand (E part); single grain; loose; lamellae of brown (7.5YR 4/4) loamy fine sand $^1/_4$ inch to 2 inches thick spaced 2 to 6 inches apart (cumulative thickness of 5 inches); clay bridges connecting sand grains in the lamellae; moderately acid.

Range in Characteristics

Depth to the base of the lamellae ranges from 4 feet to many feet. Some pedons have mottles below a depth of 40 inches. The sand particles are dominantly fine sand to a depth of 40 inches. Some pedons have material as coarse as gravel below a depth of 40 inches. Reaction is moderately acid or strongly acid in the most acid part.

The A or Ap horizon varies considerably in thickness and color because these soils are very susceptible to wind erosion; also, rodent activity is intense. Pedons in uneroded areas have an A horizon that is very dark gray (10YR 3/1) or very dark grayish brown (10YR 3/2) and is as much as 6 inches thick. Pedons in cultivated and eroded areas have an Ap horizon with value of 3 or 4 and chroma of 2 to 4. The A horizon typically is fine sand but is loamy fine sand in some pedons.

The Bw horizon, if it occurs, has hue of 7.5YR or 10YR and value and chroma of 4 to 6. It is fine sand or loamy fine sand.

The E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. It is fine sand or loamy fine sand.

The B part of the E&Bt horizon consists of lamellae $^1/_4$ inch to 2 inches thick. The lamellae have hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. They are sandy loam, loamy sand, fine sandy loam, loamy fine sand, or fine sand. The depth to the uppermost lamellae commonly is about 37 inches but ranges from 27 to 48 inches. The total thickness of the lamellae is less than 6 inches in the upper 60 inches of the profile.

CjfC—Chelsea fine sand, 5 to 12 percent slopes

Setting

Landform: Dunes on till plains and outwash plains
Position on the landform: Backslopes, shoulders, and summits

Average Composition of Components

Chelsea and similar soils: 70 percent
Oakville and similar soils: 20 percent
Brems and similar soils: 5 percent
Denham and similar soils: 5 percent

Properties and Qualities of the Chelsea Soil

Parent material: Eolian sands
Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Available water capacity: About 4.9 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

CjfD—Chelsea fine sand, 12 to 18 percent slopes

Setting

Landform: Dunes on till plains and outwash plains
Position on the landform: Backslopes, shoulders, and summits

Average Composition of Components

Chelsea and similar soils: 75 percent
Oakville and similar soils: 20 percent
Denham and similar soils: 5 percent

Properties and Qualities of the Chelsea Soil

Parent material: Eolian sands
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Available water capacity: About 4.9 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Cohoctah Series

The Cohoctah series consists of very deep, poorly drained soils on flood plains. These soils formed in loamy alluvial deposits. Permeability is moderately rapid. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, active, mesic Fluvaquentic Endoaquolls.

Typical Pedon for the Series

Cohoctah loam, on a slope of less than 1 percent, in a wooded area at an elevation of 620 feet, in Ottawa County, Michigan, about 4$^1/_2$ miles east of Pearline; 2,440 feet east and 320 feet north of the southwest corner of sec. 22, T. 7 N., R. 13 W.; USGS Grandville topographic quadrangle; latitude 42 degrees 58 minutes 25.8 seconds north and longitude 85 degrees 50 minutes 7.35 seconds west; NAD 1927:

A—0 to 13 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak medium granular structure; friable; slightly alkaline; clear smooth boundary.

Bg1—13 to 21 inches; dark gray (10YR 4/1) sandy loam; weak coarse subangular blocky structure; friable; many medium distinct very dark brown (10YR 2/2) organic stains on vertical faces of peds; slightly alkaline; clear smooth boundary.

Bg2—21 to 33 inches; grayish brown (10YR 5/2) fine sandy loam; weak coarse subangular blocky structure; friable; many fine distinct yellowish red (5YR 5/6) masses of iron oxide accumulation throughout; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Bg3—33 to 40 inches; very dark grayish brown (10YR 3/2) loam; weak coarse subangular blocky structure; friable; few fine prominent gray (10YR 5/1) masses of iron oxide depletions throughout;

strongly effervescent; moderately alkaline; abrupt wavy boundary.

Bg4—40 to 56 inches; grayish brown (10YR 5/2) sandy loam; weak coarse subangular blocky structure; friable; common medium distinct yellowish brown (10YR 5/8) masses of iron oxide accumulation throughout; strongly effervescent; moderately alkaline; clear smooth boundary.

2Cg1—56 to 72 inches; gray (10YR 5/1) sand; single grain; loose; strongly effervescent; moderately alkaline; clear wavy boundary.

2Cg2—72 to 80 inches; dark gray (10YR 4/1) coarse sand; single grain; loose; 10 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The thickness of the mollic epipedon ranges from 10 to 24 inches. The content of silt plus twice the percent of clay averages greater than 30 percent in the particle-size control section.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is loam, silt loam, sandy loam, very fine sandy loam, fine sandy loam, loamy fine sand, or mucky very fine sandy loam. Reaction ranges from slightly acid to slightly alkaline.

The Bg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 4. Some pedons have a buried A horizon. The Bg horizon is sandy loam, fine sandy loam, loamy fine sand, or loam or the mucky analogs of these textures. The content of gravel ranges from 0 to 10 percent. Some pedons contain thin layers and lenses of sand, fine sand, loamy sand, loamy fine sand, and silt loam. Reaction ranges from slightly acid to moderately alkaline.

The Cg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 2. The content of gravel ranges from 0 to 10 percent. The horizon is fine sand, loamy sand, loamy fine sand, sand, or coarse sand and has thin strata of sandy loam, fine sandy loam, loam, and silt loam. Reaction is slightly alkaline or moderately alkaline.

CmbAI—Cohoctah loam, 0 to 1 percent slopes, frequently flooded, brief duration

Setting

Landform: Backswamps on flood plains
Position on the landform: Depressions

Average Composition of Components

Cohoctah and similar soils: 75 percent
Suman and similar soils: 10 percent
Abscota and similar soils: 5 percent
Adrian and similar soils: 5 percent
Ceresco and similar soils: 5 percent

Properties and Qualities of the Cohoctah Soil

Parent material: Coarse-loamy alluvium
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 10.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

CnzAI—Cohoctah-Abscota complex, 0 to 1 percent slopes, frequently flooded, brief duration

Setting

Landform: Backswamps, natural levees, or backlands on flood plains
Position on the landform: Depressions and swells

Average Composition of Components

Cohoctah and similar soils: 45 percent
Abscota and similar soils: 35 percent
Ceresco and similar soils: 10 percent
Eel and similar soils: 5 percent
Prochaska and similar soils: 5 percent

Properties and Qualities of the Cohoctah Soil

Parent material: Coarse-loamy alluvium
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 10.2 inches to a depth of 60 inches

Properties and Qualities of the Abscota Soil

Parent material: Sandy alluvium
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Conover Series

The Conover series consists of very deep, somewhat poorly drained soils on low parts of moraines and till plains. These soils formed in loamy glacial till. Permeability is moderate or moderately slow. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, active, mesic Udollic Endoaqualfs.

Typical Pedon for the Series

Conover loam, on a convex slope of 2 percent, in a cultivated field in Washtenaw County, Michigan, about 3 miles south and 1$^1/_2$ miles east of Chelsea; 1,860 feet north and 1,840 feet west of the southeast corner of sec. 29, T. 2 S., R. 4 E.; USGS Dexter topographic quadrangle; latitude 42 degrees 16 minutes 16.58 seconds north and longitude 83 degrees 58 minutes 55.53 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; about 5 percent gravel; many fine roots; slightly acid; abrupt smooth boundary.

Bw—9 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation; common medium distinct grayish brown (10YR 5/2) iron oxide depletions; about 5 percent gravel; common fine roots; slightly acid; clear wavy boundary.

Bt1—11 to 19 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; few fine roots; common fine distinct grayish brown (10YR 5/2) iron oxide depletions; about 5 percent gravel; slightly acid; gradual wavy boundary.

Bt2—19 to 27 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; few fine roots; common medium prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation; common medium distinct gray (10YR 6/1) iron oxide depletions; about 5 percent gravel; slightly acid; gradual wavy boundary.

Cg1—27 to 50 inches; light brownish gray (10YR 6/2) loam; weak medium subangular blocky structure; firm; common medium distinct yellowish brown (10YR 5/4) masses of iron oxide accumulation; common medium faint gray (10YR 6/1) iron oxide depletions; about 5 percent gravel; slightly effervescent; moderately alkaline; gradual wavy boundary.

Cg2—50 to 60 inches; light brownish gray (10YR 6/2) loam; massive; firm; common medium prominent strong brown (7.5YR 5/6) masses of iron oxide accumulation; common medium faint gray (10YR 6/1) iron oxide depletions; about 5 percent gravel; slightly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon and the depth to effervescence range from 24 to 40 inches. The content of rock fragments ranges from 0 to 10 percent throughout the A and B horizons. Reaction generally is moderately acid or slightly acid in the A and B horizons, but in some pedons neutral is included in the range.

The Ap or A horizon has value of 2 or 3 and chroma of 1 or 2. It is loam, silt loam, or sandy loam. Some pedons have an E horizon. The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 2 or 3. It is 2 to 6 inches thick and has textures similar to those of the Ap or A horizon.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. It is loam or silt loam.

The Bt horizon has colors similar to those of the Bw horizon. It is clay loam, silty clay loam, or loam. Some pedons have a BC horizon, which is loam or clay loam and is as much as 7 inches thick. Some pedons have secondary carbonates in the lower part of the B horizon (Bk horizon) on the underside of rock fragments.

The C horizon has value of 4 to 6 and chroma of 2 or 3. It is loam, silt loam, or clay loam. It is slightly alkaline or moderately alkaline.

CpcA—Conover loam, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Conover and similar soils: 70 percent
Crosier and similar soils: 15 percent
Brookston and similar soils: 10 percent
Baugo and similar soils: 5 percent

Properties and Qualities of the Conover Soil

Parent material: Fine-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 5.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

Corwin Series

The Corwin series consists of moderately well drained soils on till plains. These soils are moderately deep to dense glacial till. They formed in calcareous till of Wisconsinan age. Permeability is moderate above the dense till and slow or very slow in the dense till. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, active, mesic Oxyaquic Argiudolls.

Typical Pedon for the Series

Corwin silt loam, on a convex slope of 3 percent, in a cultivated field in Benton County, Indiana; 520 feet north and 380 feet west of the southeast corner of sec. 29, T. 25 N., R. 8 W.; USGS Fowler topographic quadrangle; latitude 40 degrees 34 minutes 49.7 seconds north and longitude 87 degrees 20 minutes 37.7 seconds west; NAD 1927:

Ap—0 to 11 inches; 75 percent very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry, and 25 percent yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure parting to moderate medium granular; friable; many very fine roots; 1 percent pebbles; moderately acid; abrupt smooth boundary.

Bt1—11 to 15 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; few medium tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; few medium rounded very dark gray (10YR 3/1) wormcasts; 8 percent pebbles; strongly acid; clear wavy boundary.

Bt2—15 to 22 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few medium rounded dark grayish brown (10YR 4/2) wormcasts; 9 percent pebbles; strongly acid; clear wavy boundary.

Bt3—22 to 26 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common faint dark brown (10YR 4/3) clay films on faces of peds; few fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; few medium rounded dark grayish brown (10YR 4/2) wormcasts; 4 percent pebbles; slightly acid; clear wavy boundary.

Bt4—26 to 30 inches; brown (10YR 4/3) clay loam; moderate fine subangular blocky structure; firm; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; few medium distinct grayish brown (10YR 5/2) iron depletions in the matrix; few medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; few medium rounded dark grayish brown (10YR 4/2) wormcasts; 4 percent pebbles; slightly alkaline; gradual wavy boundary.

Cd1—30 to 40 inches; light olive brown (2.5Y 5/4) loam; weak very coarse prismatic structure; very firm; few medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few medium distinct yellowish brown (10YR 5/8) and few fine prominent red (2.5YR 4/8) masses of iron oxide accumulation in the matrix; few discontinuous prominent white (10YR 8/1) masses of calcium carbonate accumulation on vertical fracture faces; 7 percent pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cd2—40 to 60 inches; light olive brown (2.5Y 5/4) loam; weak very coarse prismatic structure; very firm; common medium distinct light brownish gray (10YR 6/2) iron depletions in the matrix; few medium distinct yellowish brown (10YR 5/8) and few fine prominent red (2.5YR 4/8) masses of iron oxide accumulation in the matrix; few discontinuous prominent white (10YR 8/1) masses of calcium carbonate accumulation on vertical fracture faces; 6 percent pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cd3—60 to 80 inches; brown (10YR 5/3) loam; massive; very firm; few fine distinct gray (10YR 6/1) iron depletions throughout; 6 percent pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon is 24 to 40 inches. The depth to 2-chroma iron depletions ranges from 20 to 30 inches.

The upper part of the control section (Ap, A) has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. The texture is loam or silt loam and averages 15 to 26 percent clay. Clay loam is included in the range for pedons in severely eroded areas and averages 27 to 35 percent clay. Reaction ranges from strongly acid to neutral. The content of rock fragments ranges mainly from 0 to 2 percent, but for pedons in severely eroded areas it ranges from 1 to 5 percent.

The second part of the control section (Bt) has hue of 10YR, 7.5YR, or 2.5Y, value of 4 or 5, and chroma of 3 to 6. The texture is loam or clay loam and averages 25 to 35 percent clay and 20 to 45 percent sand. Reaction ranges from strongly acid to slightly acid in the upper part and from moderately acid to slightly alkaline in the lower part. The content of rock fragments ranges from 0 to 10 percent.

The third part of the control section (BC, CB, C), if it occurs, has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. The texture is loam or silt loam and averages 10 to 25 percent clay and 20 to 50 percent sand. The content of rock fragments ranges from 2 to 10 percent. Reaction is slightly alkaline or moderately alkaline, and free carbonates occur in this part of the profile. The calcium carbonate equivalent is 5 to 30 percent.

The lower part of the control section (Cd) has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. The texture is loam or silt loam and averages 10 to 20 percent clay and 20 to 50 percent sand. The content of rock fragments ranges from 2 to 10 percent. Reaction is slightly alkaline or moderately alkaline, and free carbonates occur in this part of the profile. The calcium carbonate equivalent is 20 to 30 percent. Moist bulk density ranges from 1.75 to 1.95 g/cc.

CqmA—Corwin fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Corwin and similar soils: 80 percent
Darroch and similar soils: 10 percent
Brookston and similar soils: 5 percent
Odell and similar soils: 5 percent

Properties and Qualities of the Corwin Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Moderately well drained
Available water capacity: About 4.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Crosier Series

The Crosier series consists of somewhat poorly drained soils on till plains and moraines. These soils are moderately deep to dense till. They formed in glacial till. Permeability is moderate in the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow in the substratum. Slopes range from 0 to 4 percent.

These soils are classified as fine-loamy, mixed, active, mesic Aeric Epiaqualfs.

Typical Pedon for the Series

Crosier loam, on a slope of 1 percent, in a cultivated field at an elevation of 852 feet, in St. Joseph County, Indiana, approximately 1 1/2 miles north and 1 1/4 miles east of Woodland; 280 feet south and 560 feet east of the northwest corner of sec. 11, T. 36 N., R. 3 E.; USGS Wyatt topographic quadrangle; latitude 41 degrees 35 minutes 34.38 seconds north and longitude 86 degrees 9 minutes 21.28 seconds west; NAD 1927:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; 1 percent gravel; neutral; abrupt smooth boundary.

Eg—8 to 11 inches; grayish brown (10YR 5/2) loam; weak medium subangular blocky structure; friable; common distinct light gray (10YR 7/1) clay depletions on faces of peds; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; 1 percent gravel; slightly acid; clear smooth boundary.

Btg—11 to 20 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; many coarse prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; 5 percent gravel; slightly acid; gradual wavy boundary.

Bt—20 to 30 inches; brown (10YR 5/3) clay loam; moderate coarse subangular blocky structure; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; many medium faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; neutral; gradual wavy boundary.

BC—30 to 38 inches; brown (10YR 5/3) loam; moderate coarse subangular blocky structure; friable; common distinct dark gray (10YR 4/1) clay films on faces of peds and in pores; common prominent gray (10YR 6/1) carbonate accumulations and clay depletions on faces of peds; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulations in the matrix; 3 percent gravel; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cd—38 to 80 inches; brown (10YR 5/3) loam; weak very coarse prismatic structure; very firm; few prominent gray (10YR 6/1) carbonates on vertical faces of peds; few medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation along vertical faces of prisms; 5 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 24 to 40 inches. The depth to carbonates ranges from 20 to 40 inches. The upper 20 inches of the argillic horizon averages 30 to 60 percent sand and 20 to 34 percent clay.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Dry values are 6 or higher. This horizon is loam, silt loam, fine sandy loam, or sandy loam. The content of rock fragments ranges from 0 to 5 percent by volume. Reaction ranges from moderately acid to neutral.

The Eg horizon or the BEg horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is loam, silt loam, fine sandy loam, or sandy loam. The content of rock fragments ranges from 0 to 5 percent by volume. Reaction ranges from moderately acid to neutral.

The Btg or Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6 and has common or many redoximorphic features. It is clay loam, sandy clay loam, or loam. The content of rock fragments ranges from 0 to 5 percent by volume. Reaction ranges from strongly acid to neutral.

The BC horizon or the CB horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. It is loam, fine sandy loam, or sandy loam. It averages 12 to 25 percent clay and less than 60 percent sand. The content of pebbles ranges from 0 to 10 percent by volume, and the content of cobbles and stones is 0 to 1 percent by volume. Reaction ranges from slightly acid to moderately alkaline. The calcium carbonate equivalent ranges from 0 to 15 percent.

The Cd horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6. It is loam, fine sandy loam, or sandy loam. It averages 10 to 20 percent clay and less than 60 percent sand. The content of pebbles ranges from 0 to 10 percent by volume, and the content of cobbles and stones is 0 to 1 percent by volume. Reaction is slightly alkaline or moderately alkaline. The calcium carbonate equivalent ranges from 15 to 35 percent.

CuyA—Crosier fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Crosier and similar soils: 75 percent
Conover and similar soils: 10 percent
Brookston and similar soils: 5 percent
Selfridge and similar soils: 5 percent
Williamstown and similar soils: 5 percent

Properties and Qualities of the Crosier Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 0 to 1 percent

Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Available water capacity: About 4.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Denham Series

The Denham series consists of very deep, moderately well drained soils on outwash plains, glacial lake plains, and moraines. These soils formed in sandy eolian deposits. Permeability is rapid or very rapid. Slopes range from 0 to 5 percent.

These soils are classified as mixed, mesic Oxyaquic Udipsamments.

Typical Pedon for the Series

Denham fine sand, on a slope of 4 percent, in a cultivated field, at an elevation of about 683 feet, in Pulaski County, Indiana; 1,225 feet south and 2,550 feet west of the northeast corner of sec. 30, T. 30 N., R. 4 W.; USGS Medaryville topographical quadrangle; latitude 41 degrees 1 minute 26 seconds north and longitude 86 degrees 55 minutes 12.8 seconds west; NAD 1927:

Ap—0 to 9 inches; dark brown (10YR 3/3) fine sand, grayish brown (10YR 5/2) dry; weak medium granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.
Bw1—9 to 17 inches; dark yellowish brown (10YR 4/6) fine sand; weak medium subangular blocky structure; very friable; common fine roots; neutral; clear wavy boundary.
Bw2—17 to 38 inches; yellowish brown (10YR 5/6) fine sand; weak medium subangular blocky structure; very friable; common fine roots in the upper half and few fine roots in the lower half; slightly acid; clear wavy boundary.
Bw3—38 to 49 inches; brownish yellow (10YR 6/6) fine sand; weak medium and coarse subangular blocky structure; very friable; few fine roots; many medium distinct strong brown (7.5YR 5/8) and common fine distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; neutral; clear wavy boundary.
BC1—49 to 62 inches; brown (10YR 5/3) fine sand; weak coarse subangular blocky structure; very friable; few medium faint yellowish brown (10YR 5/4) and few medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; neutral; clear wavy boundary.
BC2—62 to 80 inches; brown (10YR 5/3) loamy fine sand; weak coarse subangular blocky structure; very friable; many coarse prominent strong brown (7.5YR 4/6) masses of iron accumulation in the matrix; common fine faint light brownish gray (10YR 6/2) iron depletions in the matrix; neutral.

Range in Characteristics

The particle-size control section ranges from 50 to 90 percent fine sand, 0 to 25 percent very fine sand, and less than 10 percent silt plus clay.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Some pedons have an A horizon. This horizon, if it occurs, has hue of 10YR, value of 2 or 3, and chroma of 1 to 3 and is 1 to 4 inches thick. The Ap or A horizon is loamy sand, loamy fine sand, sand, or fine sand. Reaction ranges from strongly acid to neutral.

Some pedons have an E horizon. This horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 or 3. It is fine sand or loamy fine sand. Reaction ranges from very strongly acid to neutral.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is typically fine sand or loamy fine sand. Redoximorphic features above a depth of 40 inches have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. Redoximorphic features below a depth of 40 inches have chroma of 1 to 8. Reaction in the Bw horizon ranges from very strongly acid to neutral.

The BC horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. Redoximorphic features have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 8. Reaction ranges from very strongly acid to neutral.

DbsA—Denham fine sand, 0 to 1 percent slopes

Setting

Landform: Dunes on lake plains, moraines, and outwash plains
Position on the landform: Swells

Average Composition of Components

Denham and similar soils: 75 percent

Brems and similar soils: 10 percent
Oakville and similar soils: 10 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Denham Soil

Parent material: Eolian sands
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

DbsB—Denham fine sand, 1 to 5 percent slopes

Setting

Landform: Dunes on lake plains, moraines, and outwash plains
Position on the landform: Swells and footslopes

Average Composition of Components

Denham and similar soils: 75 percent
Brems and similar soils: 10 percent
Oakville and similar soils: 10 percent
Chelsea and similar soils: 5 percent

Properties and Qualities of the Denham Soil

Parent material: Eolian sands
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Edselton Series

The Edselton series consists of very deep, very poorly drained soils on outwash plains, lake plains and terraces, flood plains, moraines, and till plains. These soils formed in herbaceous organic materials overlying marly material and sand deposits. Permeability is moderately slow to moderately rapid in the organic material, slow in the marly material, and rapid in the sandy material. Slopes are 0 to 1 percent.

These soils are classified as marly, euic, mesic Limnic Haplosaprists.

Typical Pedon for the Series

Edselton muck, on a slope of less than 1 percent, in an area of grass vegetation in Pulaski County, Indiana, about 2 miles west and 2.5 miles south of Star City; 2,530 feet east and 2,465 feet south of the northwest corner of sec. 25, T. 29 N., R. 2 W.; USGS Star City topographic quadrangle; latitude 40 degrees 56 minutes 0.1 second north and longitude 86 degrees 35 minutes 39.3 seconds west; NAD 1927:

Op—0 to 10 inches; muck, black (N 2.5/0) broken face and rubbed; a trace of fiber rubbed and unrubbed; moderate medium granular structure; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

Oa—10 to 21 inches; muck, very dark brown (10YR 2/2) broken face and rubbed; about 3 percent fiber, a trace rubbed; moderate medium platy structure; friable; common very fine and fine roots; neutral; clear smooth boundary.

Lma1—21 to 28 inches; grayish brown (2.5Y 5/2) marly silt loam; massive; friable; common medium prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; slightly effervescent; slightly alkaline; clear wavy boundary.

Lma2—28 to 34 inches; light brownish gray (2.5Y 6/2) marly silt loam; massive; friable; many coarse prominent light yellowish brown (10YR 6/4) masses of iron oxide accumulation in the matrix; common medium faint light gray (2.5Y 7/1) iron oxide depletions in the matrix; violently effervescent; moderately alkaline; clear wavy boundary.

Lma3—34 to 44 inches; gray (N 5/0) marly silt loam; massive; friable; common medium prominent light olive brown (2.5Y 5/4) masses of iron oxide accumulation in the matrix; strongly effervescent; moderately alkaline; clear wavy boundary.

Lma4—44 to 48 inches; gray (N 5/0) marly silt loam; massive; friable; few medium distinct light olive brown (2.5Y 5/3) masses of iron oxide

accumulation in the matrix; strongly effervescent; moderately alkaline; clear wavy boundary.
2Cg—48 to 80 inches; gray (2.5Y 5/1) sand; single grain; loose; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the marly material (Lma horizons) ranges from 16 to 47 inches. The depth to the sand typically ranges from 30 to 51 inches but ranges from 24 to 51 inches.

The Op horizon, if it occurs, has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. Reaction ranges from strongly acid to slightly alkaline.

The Oa horizon has hue of 10YR to 5YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 3. Reaction ranges from strongly acid to slightly alkaline.

The Lma horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 8 and chroma of 0 to 2. Reaction is slightly alkaline or moderately alkaline. A layer (less than 2 inches thick) of coprogenous earth is above the marly silt loam in some pedons.

The 2Cg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is sand, coarse sand, fine sand, or loamy sand or the gravelly analogs of these textures. The content of rock fragments ranges from 0 to 25 percent. Reaction is slightly alkaline or moderately alkaline.

EcrAN—Edselton muck, drained, 0 to 1 percent slopes

Setting

Landform: Outwash plains and lake plains
Position on the landform: Depressions

Average Composition of Components

Edselton and similar soils: 70 percent
Edwards and similar soils: 10 percent
Madaus and similar soils: 10 percent
Adrian and similar soils: 5 percent
Houghton and similar soils: 5 percent

Properties and Qualities of the Edselton Soil

Parent material: Herbaceous organic material over marl over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 9.0 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

EcrAU—Edselton muck, undrained, 0 to 1 percent slopes

Setting

Landform: Outwash plains, lake plains, ground moraines, and flood plains
Position on the landform: Depressions

Average Composition of Components

Edselton and similar soils: 70 percent
Madaus and similar soils: 10 percent
Adrian and similar soils: 5 percent
Edwards and similar soils: 5 percent
Houghton and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Edselton Soil

Parent material: Herbaceous organic material over marl over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 9.0 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Edwards Series

The Edwards series consists of very deep, very poorly drained soils on outwash plains, lake plains, and ground moraines. These soils formed in herbaceous organic materials 16 to 50 inches thick overlying marly material. Permeability is moderately slow to moderately rapid in the organic material and slow in the marly material. Slopes are 0 to 1 percent.

These soils are classified as marly, euic, mesic Limnic Haplosaprists.

Typical Pedon for the Series

Edwards muck (fig. 15), on a slope of less than 1 percent, in an area of idle land that supports shrubs and trees, at an elevation of 955 feet, in Jackson County, Michigan, within the city limits of Jackson; 924 feet south and 1,320 feet east of the northwest corner of sec. 36, T. 2 S., R. 1 W.; USGS Jackson North topographic quadrangle; latitude 42 degrees 15 minutes 45 seconds north and longitude 84 degrees 22 minutes 30 seconds west; NAD 1927:

Oa1—0 to 7 inches; muck, black (N 2.5/0) broken face and rubbed; a trace of fiber unrubbed and rubbed; weak medium subangular blocky structure parting to moderate coarse granular; very friable; neutral; clear smooth boundary.

Oa2—7 to 13 inches; muck, dark reddish brown (5YR 3/2) broken face and black (5YR 2.5/1) rubbed; 8 percent fiber unrubbed, a trace rubbed; moderate medium subangular blocky structure; very friable; slightly alkaline; clear wavy boundary.

Oa3—13 to 17 inches; muck, dark reddish brown (5YR 3/2) broken face and black (5YR 2.5/1) rubbed; 35 percent fiber, 5 percent rubbed; weak thin platy structure; very friable; slightly alkaline; clear smooth boundary.

Oa4—17 to 24 inches; muck, 50 percent very dark gray (5YR 3/1) and 50 percent dark reddish brown (5YR 3/3) broken face, black (5YR 2.5/1) rubbed; 25 percent fiber, 2 percent rubbed; weak thin platy structure; friable; neutral; abrupt smooth boundary.

Lma1—24 to 40 inches; 90 percent gray (10YR 5/1) and 10 percent gray (10YR 6/1) marly silty clay loam; 2-inch strata of muck at a depth of 37 inches; massive; friable; dark yellowish brown (10YR 4/6) masses of iron oxide accumulation around organic remnants; violently effervescent throughout; moderately alkaline; gradual smooth boundary.

Lma2—40 to 85 inches; grayish brown (10YR 5/2) marly silt loam; massive; friable; black (N 2/0) organic spots; violently effervescent throughout; moderately alkaline.

Range in Characteristics

The depth to marly material (Lma horizons) ranges from 16 to 51 inches. The organic fibers are derived primarily from herbaceous plants, but some layers contain as much as 20 percent woody material. Reaction in the organic material ranges from very strongly acid to slightly alkaline. Free carbonates are in the organic layers in some pedons.

The surface tier (Oa1 or Op) has hue of 10YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 2. It is dominantly muck, but it is mucky peat (hemic material) in some pedons.

The subsurface and bottom tiers (Oa horizons) have hue of 10YR to 5YR or are neutral in hue. They have value of 2 to 4 and chroma of 0 to 3. Thin layers (less than 10 inches thick) of mucky peat (hemic material) are in some pedons.

The Lma horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 or 2. It is marly silt loam or marly silty clay loam. Reaction ranges from neutral to moderately alkaline. A layer (less than 2 inches thick) of coprogenous material is above the marly material in some pedons. In some pedons the marly material has a layer of sandy or loamy material less than 12 inches thick within a depth of 51 inches. Some pedons have thin strata (less than 3 inches thick) of muck (sapric material).

EchAN—Edwards muck, drained, 0 to 1 percent slopes

Setting

Landform: Outwash plains, lake plains, and ground moraines
Position on the landform: Depressions

Average Composition of Components

Edwards and similar soils: 80 percent
Madaus and similar soils: 8 percent
Houghton and similar soils: 7 percent
Adrian and similar soils: 5 percent

Properties and Qualities of the Edwards Soil

Parent material: Herbaceous organic material over marl
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 9.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

EchAU—Edwards muck, undrained, 0 to 1 percent slopes

Setting

Landform: Outwash plains, lake plains, and ground moraines
Position on the landform: Depressions

Average Composition of Components

Edwards and similar soils: 75 percent
Madaus and similar soils: 8 percent
Houghton and similar soils: 7 percent
Adrian and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Edwards Soil

Parent material: Herbaceous organic material over marl
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 9.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

Francesville Series

The Francesville series consists of somewhat poorly drained soils on moraines and till plains. These soils are moderately deep to dense till and are deep or very deep to bedrock. They formed in loamy glacial till overlying limestone bedrock. Permeability is moderate in the subsoil, slow in the loamy substratum, and very slow or impermeable in the limestone bedrock. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, superactive, mesic Aquic Argiudolls.

Typical Pedon for the Series

Francesville fine sandy loam (fig. 16), on a slope of less than 1 percent, in a cultivated field at an elevation of 680 feet, in Pulaski County, Indiana; 615 feet west and 522 feet north of the southeast corner of sec. 9, T. 29 N., R. 4 W.; USGS Monon NE topographic quadrangle; latitude 40 degrees 58 minutes 17.68 seconds north and longitude 86 degrees 52 minutes 29.49 seconds west; NAD 1927:

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak medium granular structure; friable; few fine and very fine roots throughout; 2 percent gravel; moderately acid; abrupt smooth boundary.

Bt1—12 to 20 inches; brown (10YR 4/3) sandy clay loam; moderate medium subangular blocky structure; friable; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; few fine distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; distinct patchy very dark grayish brown (10YR 3/2) organic coats; 5 percent gravel; moderately acid; clear wavy boundary.

Bt2—20 to 27 inches; brown (10YR 5/3) fine sandy loam; weak medium subangular blocky structure; friable; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; common fine faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; 5 percent gravel; neutral; clear wavy boundary.

Cd1—27 to 43 inches; yellowish brown (10YR 5/4) fine sandy loam; weak coarse and very coarse prismatic structure; very firm; many distinct light brownish gray (10YR 6/2) carbonate coats on the upper surfaces of peds or rocks; common fine prominent rounded yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; strongly effervescent; 5 percent gravel; slightly alkaline; clear wavy boundary.

Cd2—43 to 56 inches; yellowish brown (10YR 5/4) fine sandy loam; weak very coarse prismatic structure; very firm; very few distinct light brownish gray (10YR 6/2) carbonate coats on the upper surfaces of peds or rocks; common fine rounded yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; strongly effervescent; 5 percent gravel; slightly alkaline; abrupt wavy boundary.

R—56 inches; white (10YR 8/1), unweathered limestone bedrock; indurated; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon and a densic contact ranges from 24 to 40 inches. The depth to the top of the bedrock ranges from 40 to 80 inches but is mainly 40 to 60 inches. The average clay content of the texture control section ranges from 20 to 35 percent.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. It is commonly fine sandy loam, sandy loam, loam, or silt loam. Reaction ranges from neutral to moderately acid.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is sandy clay loam, clay loam, fine sandy loam, or loam. Reaction ranges from neutral to moderately acid.

The Cd horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or fine sandy loam. It averages 10 to 20 percent clay and less than 60 percent sand. Reaction is slightly alkaline or moderately alkaline, and free carbonates are in this horizon.

The R layer has hue of 10YR, value of 7 or 8, and chroma of 1 or 2. It is very strongly cemented or indurated.

Gilford Series

The Gilford series consists of very deep, poorly drained or very poorly drained soils on outwash plains and flood-plain steps. These soils formed in loamy over sandy sediments. Permeability is moderately rapid in the surface layer and the subsoil and rapid in the substratum. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, superactive, mesic Typic Endoaquolls.

Typical Pedon for the Series

Gilford sandy loam, on a slope of less than 1 percent, in a cultivated field at an elevation of 766 feet, in St. Joseph County, Indiana, about 6 miles east and 3 miles north of South Bend; 1,900 feet west and 50 feet north of the southeast corner of sec. 24, T. 38 N., R. 3 E.; USGS South Bend East topographic quadrangle; latitude 41 degrees 43 minutes 28.9 seconds north and longitude 86 degrees 7 minutes 36 seconds west; NAD 1927:

Ap—0 to 11 inches; black (10YR 2/1) sandy loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—11 to 14 inches; very dark gray (10YR 3/1) sandy loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; slightly acid; gradual wavy boundary.

Bg1—14 to 20 inches; gray (10YR 5/1) sandy loam; weak medium subangular blocky structure; friable; common fine prominent yellowish brown (10YR 5/6) iron oxide masses in the matrix; moderately acid; clear irregular boundary.

Bg2—20 to 32 inches; gray (10YR 5/1) sandy loam; moderate medium subangular blocky structure; firm; common fine prominent yellowish brown (10YR 5/6) iron oxide masses in the matrix; slightly acid; clear wavy boundary.

BCg—32 to 38 inches; gray (10YR 6/1) loamy sand; weak fine subangular blocky structure; very friable; common medium prominent strong brown (7.5YR 5/6) masses of iron oxide accumulation; neutral; clear wavy boundary.

Cg1—38 to 48 inches; gray (10YR 6/1) sand; single grain; loose; neutral; clear wavy boundary.

Cg2—48 to 80 inches; gray (10YR 6/1) coarse sand and sand; single grain; loose; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the cambic horizon ranges from 24 to 50 inches. The content of rock fragments (fine gravel) in the series control section ranges from 0 to 3 percent, by volume, in the upper part and from 0 to 10 percent in the lower part.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is fine sandy loam, loam, or sandy loam or the mucky analogs of these textures. Reaction ranges from moderately acid to neutral.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It typically has redoximorphic concentrations. It is fine sandy loam or sandy loam. Reaction ranges from moderately acid to neutral.

The BCg horizon is at a depth of 30 to 40 inches. It has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is loamy sand, loamy fine sand, fine sand, or sand. Reaction is slightly acid or neutral.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 3. It is loamy sand, sand, coarse sand, or fine sand. Reaction is slightly acid or neutral above a depth of 40 inches and ranges from neutral to moderately alkaline below a depth of 40 inches. Free calcium carbonate is in at least one horizon between depths of 40 and 55 inches.

GcwA—Gilford fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Flats, depressions

Average Composition of Components

Gilford and similar soils: 85 percent
Adrian and similar soils: 5 percent
Granby and similar soils: 5 percent
Sebewa and similar soils: 5 percent

Properties and Qualities of the Gilford Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

GdvA—Gilford-Monon fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Gilford and similar soils: 45 percent
Monon and similar soils: 35 percent
Brookston and similar soils: 10 percent
Brady and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Gilford Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Properties and Qualities of the Monon Soil

Parent material: Coarse-loamy and/or sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: 40 to 80 inches to bedrock (lithic)
Drainage class: Poorly drained
Available water capacity: About 6.8 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Goodell Series

The Goodell series consists of very deep, poorly drained and very poorly drained soils on till plains. These soils formed in loamy outwash overlying sandy outwash and loamy till. Permeability is moderately rapid in the sandy outwash and slow in the underlying glacial till. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, superactive, mesic Typic Endoaquolls.

Typical Pedon for the Series

Goodell fine sandy loam, on a slope of less than 1 percent, in a cultivated field at an elevation of 699 feet, in Pulaski County, Indiana, about 3 miles south of Winamac; 1,380 feet east and 2,360 feet north of the southwest corner of sec. 36, T. 30 N., R. 2 W.; USGS Winamac topographic quadrangle; latitude 41 degrees 0 minutes 13.1 seconds north and longitude 86 degrees 35 minutes 52.7 seconds west; NAD 1927:

Ap—0 to 12 inches; very dark gray (10YR 3/1) fine sandy loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; common fine roots throughout; neutral; abrupt smooth boundary.

Bg1—12 to 17 inches; dark gray (10YR 4/1) fine sandy loam; moderate medium subangular blocky structure; friable; common fine roots throughout; common medium prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Bg2—17 to 22 inches; grayish brown (10YR 5/2) fine sandy loam and loam; moderate medium subangular blocky structure; friable; many coarse prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common coarse faint dark gray (10YR 4/1) iron oxide depletions in the matrix; neutral; gradual wavy boundary.

Bg3—22 to 32 inches; grayish brown (10YR 5/2) fine sandy loam; moderate medium subangular blocky structure; friable; many medium distinct yellowish brown (10YR 5/4) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Cg1—32 to 36 inches; grayish brown (10YR 5/2) fine sand; weak coarse subangular blocky structure; friable; many medium faint brown (10YR 5/3) masses of iron oxide accumulation in the matrix; strongly effervescent throughout; slightly alkaline; clear wavy boundary.

Cg2—36 to 52 inches; grayish brown (10YR 5/2) sand; single grain; friable; strongly effervescent throughout; 7 percent gravel; slightly alkaline; clear wavy boundary.

2Cg3—52 to 56 inches; gray (10YR 5/1) fine sandy loam; massive; friable; strongly effervescent throughout; 8 percent gravel and cobbles; slightly alkaline; clear wavy boundary.

2Cg4—56 to 80 inches; gray (10YR 5/1) loam; massive; firm; strongly effervescent throughout; 8 percent gravel and cobbles; slightly alkaline.

Range in Characteristics

The depth to the base of the cambic horizon ranges from 30 to 50 inches. The depth to loam or fine sandy loam till ranges from 40 to 60 inches. The sands in the particle-size control section are less than 85 percent fine sand and very fine sand. The mean annual air temperature ranges from 48 to 55 degrees F.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is fine sandy loam, loam, or sandy loam. The content of rock fragments ranges from 0 to 5 percent. Reaction ranges from moderately acid to neutral.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2 and contains redoximorphic features. It is fine sandy loam or sandy loam. It also contains strata of loam in some pedons. The content of rock fragments ranges from 0 to 5 percent. Reaction ranges from moderately acid to neutral.

Some pedons have a BC horizon below a depth of 30 to 40 inches. This horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2 and contains redoximorphic features. It is loamy sand, loamy fine sand, or sand. The content of rock fragments ranges from 0 to 10 percent.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is sand, coarse sand, or fine sand. The content of rock fragments ranges from 0 to 10 percent. Reaction is slightly alkaline or moderately alkaline.

The 2Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is loam or fine sandy loam. The depth to this horizon commonly ranges from 40 to 60 inches. The content of rock fragments ranges from 1 to 10 percent. Reaction is slightly alkaline or moderately alkaline.

GmnA—Goodell-Gilford fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Till plains and outwash plains
Position on the landform: Depressions

Average Composition of Components

Goodell and similar soils: 50 percent
Gilford and similar soils: 35 percent
Brookston and similar soils: 5 percent
Granby and similar soils: 5 percent
Gumz and similar soils: 5 percent

Properties and Qualities of the Goodell Soil

Parent material: Coarse-loamy outwash over sandy outwash over loamy till
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 7.2 inches to a depth of 60 inches

Properties and Qualities of the Gilford Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Granby Series

The Granby series consists of very deep, poorly drained and very poorly drained soils on outwash plains and lake plains and in glacial drainageways. These soils formed in sandy glacial outwash. Permeability is rapid. Slopes are 0 to 1 percent.

These soils are classified as sandy, mixed, mesic Typic Endoaquolls.

Typical Pedon for the Series

Granby loamy sand, on a slope of 1 percent, in a cultivated field, in Ottawa County, Michigan, about 7 miles west and 1/2 mile south of Allendale; 350 feet east and 400 feet north of the center of sec. 28, T. 7 N., R. 15 W.; USGS Borculo topographical quadrangle; latitude 42 degrees 57 minutes 58.42 seconds north and longitude 86 degrees 5 minutes 28.51 seconds west; NAD 1927:

Ap—0 to 10 inches; black (10YR 2/1) loamy sand, dark grayish brown (10YR 4/2) dry; weak medium granular structure; very friable; neutral; abrupt wavy boundary.

Bg1—10 to 16 inches; dark gray (10YR 4/1) sand; weak coarse subangular blocky structure; very friable; few medium faint light brownish gray (10YR 6/2) iron oxide depletions in the matrix; slightly acid; gradual wavy boundary.

Bg2—16 to 32 inches; light brownish gray (10YR 6/2) sand; weak coarse subangular blocky structure; very friable; common medium faint dark gray (10YR 4/1) and gray (10YR 5/1) iron oxide depletions in the matrix; neutral; clear wavy boundary.

Cg—32 to 80 inches; light gray (10YR 7/2) sand; single grain; loose; common medium faint grayish brown (10YR 5/2) and few medium faint gray (10YR 5/1) iron oxide depletions in the matrix; neutral.

Range in Characteristics

The depth to the C horizon typically is 30 to 40 inches but ranges from 20 to 52 inches.

The upper part of the control section (Ap) has hue of 10YR or 5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is sand, mucky sand, loamy sand, mucky loamy sand, loamy fine sand, mucky loamy fine sand, fine sand, mucky fine sand, fine sandy loam, sandy loam, or loam. Reaction ranges from moderately acid to neutral.

The second part of the control section (B, Bg) has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3, or it has hue of 5Y and chroma of 3 or less with distinct or prominent redoximorphic features. Pedons that do not have a dominant chroma of 2 or less have colors resulting from uncoated mineral grains. The texture is fine sand, sand, loamy sand, or loamy fine sand. The content of pebbles ranges from 0 to 5 percent. Reaction ranges from moderately acid to slightly alkaline.

The lower part of the control section (C) has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 4. It is sand, coarse sand, fine sand, loamy fine sand, or loamy sand. The content of pebbles ranges from 0 to 5 percent. Reaction ranges from slightly acid to moderately alkaline.

A clayey substratum phase that has silty clay, clay, and silty clay loam at a depth between 60 and 80 inches is recognized. This clayey substratum phase is slightly or moderately alkaline in the clayey material.

GrfA—Granby loamy fine sand, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Granby and similar soils: 75 percent
Maumee and similar soils: 10 percent
Gilford and similar soils: 5 percent
Houghton and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Granby Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

GsaA—Granby-Gilford complex, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Granby and similar soils: 50 percent
Gilford and similar soils: 35 percent
Brady and similar soils: 5 percent
Maumee and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Granby Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 4.5 inches to a depth of 60 inches

Properties and Qualities of the Gilford Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Gumz Series

The Gumz series consists of very deep, poorly drained and very poorly drained soils on outwash plains and till plains. These soils formed in sandy glacial outwash overlying loamy glacial till. Permeability is rapid in the sandy material and slow in the underlying glacial till. Slopes are 0 to 1 percent.

These soils are classified as sandy, mixed, mesic Typic Endoaquolls.

Typical Pedon for the Series

Gumz fine sandy loam (fig. 17), on a slope of less than 1 percent, in a cultivated field in Pulaski County, Indiana, about 4 miles east and 1 mile north of Winamac; 2,620 feet east and 1,900 feet south of the northwest corner of sec. 10, T. 30 N., R. 1 W.; USGS Winamac topographic quadrangle; latitude 41 degrees 3 minutes 51.9 seconds north and longitude 86 degrees 31 minutes 1.4 seconds west; NAD 1927:

Ap—0 to 9 inches; black (10YR 2/1) fine sandy loam, very dark gray (10YR 3/1) dry; weak fine granular structure; very friable; few very fine and fine roots; slightly acid; abrupt smooth boundary.

A—9 to 12 inches; black (10YR 2/1) fine sandy loam, very dark gray (10YR 3/1) dry; moderate thick platy and moderate medium subangular blocky structure; very friable; few very fine and fine roots; slightly acid; clear wavy boundary.

Bg1—12 to 18 inches; grayish brown (10YR 5/2) sand; weak coarse subangular blocky structure; very friable; few fine roots; many medium distinct yellowish brown (10YR 5/4) and common medium brown (10YR 4/3) masses of iron oxide accumulation in the matrix; slightly acid; clear wavy boundary.

Bg2—18 to 25 inches; light brownish gray (10YR 6/2) sand; weak coarse subangular blocky structure; very friable; many medium distinct light yellowish brown (10YR 6/4) and many medium distinct yellowish brown (10YR 5/4) masses of iron oxide accumulation in the matrix; strongly effervescent; neutral; clear wavy boundary.

C1—25 to 42 inches; yellowish brown (10YR 5/4) sand; single grain; loose; common medium distinct yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; many medium distinct light brownish gray (10YR 6/2) iron oxide depletions in the matrix; strongly effervescent; slightly alkaline; clear wavy boundary.

C2—42 to 50 inches; brown (10YR 5/3) gravelly sand;

single grain; loose; 20 percent gravel; strongly effervescent; slightly alkaline; abrupt wavy boundary.

2Cg—50 to 80 inches; gray (10YR 5/1) fine sandy loam; massive; firm; 10 percent gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of soil development ranges from 20 to 52 inches. The depth to glacial till ranges from 40 to 60 inches. Reaction ranges from moderately acid to slightly alkaline in the sandy outwash and is slightly alkaline or moderately alkaline in the underlying till.

The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. It is loamy fine sand, loamy sand, sandy loam, or fine sandy loam. The content of rock fragments ranges from 0 to 5 percent. Reaction ranges from moderately acid to neutral.

The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is sand, fine sand, loamy fine sand, or loamy sand. Some pedons have a layer (1 to 3 inches thick) of clay loam or sandy clay loam immediately below the A horizons. Some pedons have masses of sandy loam 1 to 3 inches in diameter. The content of rock fragments ranges from 0 to 5 percent in the Bg horizon. Reaction ranges from moderately acid to neutral.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 4. It is sand, fine sand, coarse sand, gravelly sand, or gravelly coarse sand. The content of rock fragments ranges from 0 to 25 percent. Reaction is slightly alkaline or moderately alkaline.

The 2C horizon has colors similar to those of the C horizon. It is loam or fine sandy loam. The content of rock fragments ranges from 1 to 14 percent. Reaction is slightly alkaline or moderately alkaline.

Headlee Series

The Headlee series consists of very deep, somewhat poorly drained soils on lake plains. These soils formed in loamy water-sorted material 20 to 40 inches thick and in the underlying lacustrine materials. Permeability is moderate in the loamy material and slow or very slow in the underlying lacustrine materials. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, active, mesic Udollic Epiaqualfs.

Typical Pedon for the Series

Headlee fine sandy loam (fig. 18), in a nearly level area, in a cultivated field at an elevation of 681 feet, in Pulaski County, Indiana, about 3 miles north and 0.5 mile west of Francesville; 1,960 feet east and 510 feet south of the northwest corner of sec. 29, T. 30 N., R. 4 W.; USGS Medaryville topographic quadrangle; latitude 41 degrees 1 minute 32.8 seconds north and longitude 86 degrees 54 minutes 13.3 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine and fine roots throughout; neutral; abrupt smooth boundary.

Bt1—9 to 13 inches; brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; few very fine roots throughout; common fine interstitial and tubular pores; few faint dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; neutral; clear wavy boundary.

Bt2—13 to 22 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate fine subangular blocky structure; friable; few very fine roots throughout; common fine interstitial and tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; many medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; slightly acid; clear wavy boundary.

2Bt3—22 to 26 inches; brown (10YR 5/3) clay loam; moderate medium subangular blocky structure; firm; few very fine roots between peds; common fine interstitial and tubular pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; slightly acid; clear wavy boundary.

2Bt4—26 to 30 inches; brown (10YR 5/3) silty clay; moderate medium subangular blocky structure; firm; few very fine roots between peds; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common medium faint yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; many medium faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; slightly effervescent; slightly alkaline; clear wavy boundary.

2Bt5—30 to 42 inches; brown (10YR 5/3) silty clay; moderate medium subangular blocky structure; firm; few very fine roots between peds; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct discontinuous light gray (10YR 7/1) carbonate coats on vertical faces of peds; many medium distinct gray (10YR 6/1) iron oxide depletions in the matrix; strongly effervescent; moderately alkaline; clear wavy boundary.

3BC—42 to 50 inches; yellowish brown (10YR 5/4) loamy fine sand; single grain; loose; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; strongly effervescent; moderately alkaline; clear wavy boundary.

4C1—50 to 65 inches; yellowish brown (10YR 5/4) silt loam; massive; firm; common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; many medium distinct light brownish gray (10YR 6/2) iron oxide depletions in the matrix; strongly effervescent; moderately alkaline; clear wavy boundary.

4C2—65 to 80 inches; brown (10YR 4/3) silty clay loam; massive; firm; common medium faint brown (10YR 5/3) masses of iron accumulation in the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 30 to 55 inches. The depth to the top of the carbonates ranges from 24 to 55 inches. The argillic horizon typically extends into the underlying lacustrine materials. The depth to the underlying lacustrine materials ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. It is loam, sandy loam, or fine sandy loam. The content of rock fragments ranges from 0 to 10 percent by volume. Reaction ranges from moderately acid to neutral.

The E or BE horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. It is loam, sandy loam, or fine sandy loam. The content of rock fragments ranges from 0 to 10 percent by volume. Reaction ranges from moderately acid to neutral.

The Bt and Btg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. The texture is dominantly clay loam or sandy clay loam, but the range includes loam, fine sandy loam, and sandy loam. The content of rock fragments ranges from 0 to 15 percent by volume. Reaction ranges from moderately acid to neutral.

The 2Bt, 2Btg, 2BCtg, 2BC, or 2BCg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. The texture is clay, silty clay, silty clay loam, or clay loam with a clay content of 27 to 45 percent. Reaction ranges from slightly acid to slightly alkaline.

The 3BC or 3BCg horizon has colors similar to those of the 2B horizon. The texture is loamy fine sand, fine sand, or very fine sand. Reaction ranges from neutral to moderately alkaline. Some pedons do not have a 3BC or 3BCg horizon.

The 4C, 4Cg, 2C, or 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 to 4. The texture is clay, silty clay, silty clay loam, clay loam, or silt loam. Reaction is slightly alkaline or moderately alkaline.

HbzA—Headlee-Brady fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Lake plains and outwash plains
Position on the landform: Swells

Average Composition of Components

Headlee and similar soils: 45 percent
Brady and similar soils: 35 percent
Selfridge and similar soils: 10 percent
Seward and similar soils: 5 percent
Whiskerville and similar soils: 5 percent

Properties and Qualities of the Headlee Soil

Parent material: Coarse-loamy glaciofluvial deposits over fine-loamy lacustrine deposits
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 8.5 inches to a depth of 60 inches

Properties and Qualities of the Brady Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 8.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Homer Series

The Homer series consists of very deep, somewhat poorly drained soils on outwash plains, terraces, and valley trains of Wisconsinan age. These soils formed in loamy outwash material and in the underlying stratified calcareous sand and gravelly coarse sand. Permeability is moderate in the subsoil and very rapid in the underlying sand and gravel. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy over sandy or sandy-skeletal, mixed, active, mesic Aeric Endoaqualfs.

Typical Pedon for the Series

Homer fine sandy loam, on a slope of less than 1 percent, in a cultivated field at an elevation of 788 feet, in Fulton County, Indiana, about 2.5 miles north of Fulton; 1,640 feet north and 2,120 feet west of the southeast corner of sec. 2, T. 29 N., R. 2 E.; USGS Fulton topographic quadrangle; latitude 40 degrees 59 minutes 10.14 seconds north and longitude 86 degrees 16 minutes 5.55 seconds west; NAD 1927:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; 2 percent fine gravel; slightly acid; abrupt smooth boundary.

E—8 to 16 inches; brown (10YR 5/3) fine sandy loam; moderate medium subangular blocky structure; friable; common fine faint grayish brown (10YR 5/2) iron oxide depletions throughout; common medium very dark brown (10YR 2/2) wormcasts; 2 percent fine gravel; neutral; clear wavy boundary.

Bt—16 to 22 inches; brown (10YR 4/3) sandy clay loam; moderate medium subangular blocky structure; firm; many faint dark grayish brown (10YR 4/2) iron oxide depleted clay films on faces of peds; common fine distinct dark yellowish brown (10YR 4/6) masses of iron oxide accumulation in the matrix; common fine faint dark grayish brown (10YR 4/2) iron oxide depletions in the matrix; 10 percent fine gravel; neutral; clear wavy boundary.

2Btg—22 to 30 inches; dark grayish brown (10YR 4/2) gravelly sandy clay loam; weak coarse subangular blocky structure; firm; very many faint dark grayish brown (10YR 4/2) iron oxide depleted clay films around pebbles and bridging sand grains; common fine distinct dark yellowish brown (10YR 4/6) masses of iron oxide accumulation in the matrix; 25 percent fine gravel; neutral; clear wavy boundary.

2BC—30 to 35 inches; brown (10YR 4/3) gravelly coarse sandy loam; weak coarse subangular blocky structure; friable; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; 18 percent fine gravel; neutral; abrupt wavy boundary.

3C—35 to 60 inches; brown (10YR 5/3) gravelly loamy coarse sand; single grain; loose; 20 percent gravel; strongly effervescent; moderately alkaline; clear wavy boundary.

3Cg—60 to 80 inches; grayish brown (10YR 5/2) gravelly coarse sand; single grain; loose; 25 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The thickness of the loamy material ranges from 24 to 40 inches. The depth to the 2Bt or 2BCg horizon ranges from 15 to 30 inches. A limestone substratum phase is recognized.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3. It is loam, silt loam, fine sandy loam, or sandy loam. The content of gravel ranges from 0 to 12 percent. Reaction ranges from strongly acid to neutral.

The E horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. It is silt loam, loam, fine sandy loam, or sandy loam. The content of gravel ranges from 0 to 12 percent. Reaction ranges from strongly acid to neutral.

The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 1 to 6. It is loam, sandy clay loam, or clay loam. The upper 20 inches of the argillic horizon averages between 20 to 35 percent clay. The content of gravel ranges from 0 to 14 percent. Reaction ranges from strongly acid to neutral.

The 2Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 to 6, and chroma of 1 to 4. It is gravelly sandy loam, gravelly loam, or gravelly sandy clay loam. The content of gravel ranges from 15 to 25 percent. Reaction ranges from strongly acid to neutral.

The 2BC horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 to 6, and chroma of 1 to 3. It is the gravelly analogs of coarse sandy loam, sandy loam, loam, loamy sand, or sandy clay loam. The content of gravel ranges from 15 to 25 percent. Reaction ranges from slightly acid to slightly alkaline.

The 3C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is sand or the gravelly and very gravelly analogs of coarse sand and loamy coarse sand. The content of gravel ranges from 15 to 60 percent by volume. The content of cobbles ranges from 0 to 5 percent. The horizon has slight or strong effervescence. Reaction is moderately alkaline.

HnbA—Homer sandy loam, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Swells

Average Composition of Components

Homer and similar soils: 85 percent
Brady and similar soils: 5 percent
Matherton and similar soils: 5 percent
Sebewa and similar soils: 5 percent

Properties and Qualities of the Homer Soil

Parent material: Fine-loamy outwash over sandy and gravelly outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 5.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Houghton Series

The Houghton series consists of very deep, very poorly drained soils in depressions on lake plains, outwash plains, ground moraines, end moraines, and flood plains. These soils formed in herbaceous organic deposits more than 51 inches thick. Permeability ranges from moderately slow to moderately rapid. Slopes are 0 to 1 percent.

These soils are classified as euic, mesic Typic Haplosaprists.

Typical Pedon for the Series

Houghton muck, in a level area in a cultivated field, in Clinton County, Michigan, about 3 miles northeast of the village of Bath; 200 feet north and 400 feet east of the southwest corner of sec. 12, T. 5 N., R. 1 W.; USGS Bath topographic quadrangle; latitude 42 degrees 49 minutes 43.4 seconds north and longitude 84 degrees 52 minutes 56.9 seconds west; NAD 1927:

Oa1—0 to 9 inches; muck, black (N 2.5/0) broken face and rubbed; about 5 percent fiber, a trace rubbed; weak coarse subangular blocky structure; neutral (pH 7.0 in KCl); abrupt smooth boundary.

Oa2—9 to 13 inches; muck, black (N 2.5/0) broken face, very dark brown (7.5YR 2.5/2) rubbed; about 5 percent fiber, a trace rubbed; weak medium granular structure; neutral (pH 7.0 in KCl); abrupt smooth boundary.

Oa3—13 to 24 inches; muck, dark reddish brown (5YR 3/2) broken face, dark reddish brown (5YR 2.5/2) rubbed; about 15 percent fiber, less than 5 percent rubbed; mostly massive but some thick platy fragments; neutral (pH 7.0 KCl); abrupt smooth boundary.

Oa4—24 to 32 inches; muck, black (5YR 2.5/1) broken face and rubbed; about 10 percent fiber, a trace rubbed; massive; about 1 percent woody fragments; neutral (pH 7.0 in KCl); clear wavy boundary.

Oa5—32 to 48 inches; muck, dark reddish brown (5YR 2.5/2) broken face, black (5YR 2.5/1) rubbed; about 20 percent fiber, less than 10 percent rubbed; mostly massive but some thick platy fragments; neutral (pH 7.0 in KCl); abrupt smooth boundary.

Oa6—48 to 80 inches; muck, dark reddish brown (5YR 2.5/2) broken face and rubbed; about 10 percent fiber, less than 10 percent rubbed; massive; slightly sticky; about 15 percent mineral soil; neutral (pH 7.0 in KCl).

Range in Characteristics

The organic layers are more than 51 inches thick. The organic fibers are derived primarily from herbaceous plants, but some pedons contain individual layers with as much as 30 percent woody material; however, the woody fragment content averages less than 15 percent, by volume, in the control section. Reaction ranges from very strongly acid to slightly alkaline.

The organic layers have hue of 10YR, 7.5YR, or 5YR, value of 2 to 3, and chroma of 1 to 3, or they are neutral in hue and have value of 2.5 and chroma of 0. The layers are predominantly muck (sapric material), but in some pedons mucky peat (hemic material) has a combined thickness of less than 10 inches and peat (fibric material) has a combined thickness of less than 5 inches. Some pedons have coprogenous material or marly material below a depth of 51 inches.

HtbAN—Houghton muck, drained, 0 to 1 percent slopes

Setting

Landform: Lake plains, ground moraines, end moraines, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Houghton and similar soils: 75 percent
Adrian and similar soils: 7 percent
Edwards and similar soils: 7 percent
Muskego and similar soils: 6 percent
Palms and similar soils: 5 percent

Properties and Qualities of the Houghton Soil

Parent material: Herbaceous organic material
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 23.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

HtbAU—Houghton muck, undrained, 0 to 1 percent slopes

Setting

Landform: Lake plains, ground moraines, end moraines, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Houghton and similar soils: 75 percent
Adrian and similar soils: 5 percent
Edwards and similar soils: 5 percent
Muskego and similar soils: 5 percent
Palms and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Houghton Soil

Parent material: Herbaceous organic material
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 23.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Madaus Series

The Madaus series consists of very deep, very poorly drained soils on outwash plains, lake plains and terraces, flood plains, moraines, and till plains. These soils formed in herbaceous organic materials overlying marly material and sand deposits. Permeability is moderately slow to moderately rapid in the organic material, slow in the marly material, and rapid in the sandy material. Slopes are 0 to 1 percent.

These soils are classified as coarse-silty over sandy or sandy-skeletal, carbonatic over mixed, mesic Histic Humaquepts.

Typical Pedon for the Series

Madaus muck (fig. 19), on a slope of less than 1 percent, in a cultivated field in Elkhart County, Indiana, about 3 miles east of Elkhart; 90 feet south and 600 feet west of the northeast corner of sec. 7, T. 37 N., R. 6 E.; USGS Bristol topographic quadrangle; latitude 41 degrees 40 minutes 53 seconds north and longitude 85 degrees 52 minutes 23 seconds west; NAD 1927:

Op—0 to 9 inches; muck, black (N 2.5/0) broken face and rubbed; moderate fine granular structure; very friable; common very fine and fine roots throughout; about 1 percent fiber, a trace rubbed; 1 percent shell fragments; slightly effervescent; slightly alkaline; abrupt smooth boundary.

Lma1—9 to 13 inches; gray (5Y 6/1) marly silt loam; massive; friable; common very fine and fine roots throughout; common very fine and fine moderate-continuity interstitial and tubular pores; about 1 percent fiber, a trace rubbed; 3 percent shell fragments; common fine irregular dark reddish brown (5YR 3/4) soft masses of iron oxide accumulation in root channels; violently

effervescent; moderately alkaline; clear smooth boundary.
Lma2—13 to 31 inches; light yellowish brown (10YR 6/4) marly silt loam; massive; friable; common very fine and fine roots throughout; common very fine and fine moderate-continuity interstitial and tubular pores; about 1 percent fiber, less than 1 percent rubbed; 3 percent shell fragments; common medium distinct gray (10YR 6/1) cylindrical iron oxide depletions in cracks; violently effervescent; moderately alkaline; clear smooth boundary.
Lma3—31 to 48 inches; gray (10YR 6/1) marly silt loam; massive; friable; common very fine and fine moderate-continuity interstitial and tubular pores; about 1 percent fiber, less than 1 percent rubbed; 1 percent shell fragments; violently effervescent; moderately alkaline; clear smooth boundary.
2Cg—48 to 80 inches; dark gray (5Y 4/1) sand; single grain; loose; 5 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The thickness of the organic surface layer ranges from 7 to 16 inches. The depth to sand ranges from 16 to 60 inches.

The Oa or Op horizon has hue of 10YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 2. Reaction ranges from slightly acid to moderately alkaline.

The Lma horizon has hue of 10YR to 5Y, value of 4 to 8, and chroma of 1 to 4. It is marly silt loam or marly silty clay loam. Reaction is slightly alkaline or moderately alkaline.

The 2Cg or 2C horizon has hue of 10YR, 5Y, or 2.5Y, value of 4 to 7, and chroma of 1 to 4. It is loamy sand, fine sand, sand, or coarse sand or the gravelly analogs of these textures. The content of rock fragments ranges from 0 to 25 percent. Reaction is slightly alkaline or moderately alkaline.

MfrAN—Madaus muck, drained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Madaus and similar soils: 80 percent
Edselton and similar soils: 10 percent
Moston and similar soils: 10 percent

Properties and Qualities of the Madaus Soil

Parent material: Herbaceous organic material over marl over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 4.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

MfrAU—Madaus muck, undrained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Madaus and similar soils: 75 percent
Edselton and similar soils: 10 percent
Moston and similar soils: 10 percent
Water: 5 percent

Properties and Qualities of the Madaus Soil

Parent material: Herbaceous organic material over marl over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 4.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section

- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Maumee Series

The Maumee series consists of very deep, poorly drained and very poorly drained soils on outwash plains and lake plains. These soils formed in sandy sediments in depressions. Permeability is rapid. Slopes are 0 to 1 percent.

These soils are classified as sandy, mixed, mesic Typic Endoaquolls.

Typical Pedon for the Series

Maumee loamy sand, on a slope of less than 1 percent, in a cultivated field at an elevation of 657 feet, in Porter County, Indiana; 700 feet north and 160 feet east of the southwest corner of sec. 32, T. 33 N., R. 5 W.; USGS Kouts topographic quadrangle; latitude 41 degrees 15 minutes 43.36 seconds north and longitude 87 degrees 1 minute 29.82 seconds west; NAD 1927:

Ap—0 to 10 inches; black (10YR 2/1) loamy sand, dark gray (10YR 4/1) dry; weak medium granular structure; very friable; few fine and medium roots; neutral; abrupt smooth boundary.

A—10 to 23 inches; very dark gray (10YR 3/1) loamy sand, gray (10YR 5/1) dry; weak coarse subangular blocky structure; very friable; few fine roots; few fine distinct dark yellowish brown (10YR 3/6) masses of iron oxide accumulation in the matrix; common coarse distinct dark grayish brown (10YR 4/2) iron oxide depletions in the matrix; neutral; clear wavy boundary.

Bg1—23 to 32 inches; grayish brown (10YR 5/2) sand; single grain; loose; few fine roots; few fine distinct dark yellowish brown (10YR 4/6) masses of iron oxide accumulation in the matrix; common coarse distinct dark gray (10YR 4/1) iron oxide depletions in the matrix; few fine very dark gray (10YR 3/1) organic matter accumulations in the matrix; neutral; clear wavy boundary.

Bg2—32 to 38 inches; grayish brown (10YR 5/2) sand; single grain; loose; few fine roots; common medium distinct yellowish brown (10YR 5/4) and few medium distinct dark yellowish brown (10YR 4/6) masses of iron oxide accumulation in the matrix; neutral; abrupt wavy boundary.

Cg1—38 to 61 inches; light brownish gray (10YR 6/2) fine sand; single grain; loose; common medium distinct brownish yellow (10YR 6/6) masses of iron oxide accumulation in the matrix; neutral; abrupt wavy boundary.

Cg2—61 to 80 inches; grayish brown (10YR 5/2) coarse and medium sand; single grain; loose; slightly alkaline.

Range in Characteristics

Depth to the top of the C horizon ranges from 30 to 60 inches. The thickness of the mollic epipedon ranges from 15 to 24 inches. These soils are not dry for more than 90 cumulative days following the summer solstice.

The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or it is neutral in hue and has value of 2. It is loamy fine sand, loamy sand, sand, mucky loamy sand, mucky loamy fine sand, or mucky sand. The content of pebbles ranges from 0 to 5 percent. Reaction ranges from moderately acid to slightly alkaline.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or less. It is sand, fine sand, loamy sand, or loamy fine sand. Thin subhorizons of coarse sandy loam or sandy loam (nonpedogenic) occur in some pedons. The content of pebbles ranges from 0 to 15 percent. Reaction ranges from moderately acid to neutral.

The Cg horizon typically has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or less, but it has chroma of 3 or less below a depth of 40 inches in some pedons. It is sand, coarse sand, fine sand, loamy sand, or loamy fine sand. The content of pebbles ranges from 0 to 15 percent. Reaction ranges from slightly acid to moderately alkaline. Free carbonates are below a depth of 40 inches.

MgyA—Maumee-Gilford complex, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Maumee and similar soils: 50 percent
Gilford and similar soils: 35 percent
Goodell and similar soils: 5 percent
Gumz and similar soils: 5 percent
Newton and similar soils: 5 percent

Properties and Qualities of the Maumee Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained

Figure 14.—Profile of Antung muck, 0 to 1 percent slopes, showing a thin layer of muck (black layer) above sandy material (lighter colored material).

Figure 15.—Profile of Edwards muck, drained, 0 to 1 percent slopes. This soil has about 2 feet of black muck over lighter colored marl.

Figure 16.—Profile of Francesville fine sandy loam. This soil formed in loamy glacial till and is underlain by limestone bedrock.

Figure 17.—Profile of Gumz fine sandy loam.

Figure 18.—Profile of Headlee fine sandy loam.

Figure 19.—Profile of Madaus muck, drained, 0 to 1 percent slopes, showing a thin layer of muck (black layer) above marl (lighter colored material).

Figure 20.—Profile of Navunon loam. This soil formed in loamy glacial till and is underlain by limestone bedrock.

Figure 21.—Profile of Odell fine sandy loam. This soil formed in loamy glacial till.

Figure 22.—Profile of Winamac fine sandy loam, 0 to 1 percent slopes.

Available water capacity: About 5.4 inches to a depth of 60 inches

Properties and Qualities of the Gilford Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

MgzA—Maumee-Gumz complex, 0 to 1 percent slopes

Setting

Landform: Till plains and outwash plains
Position on the landform: Depressions

Average Composition of Components

Maumee and similar soils: 45 percent
Gumz and similar soils: 35 percent
Brookston and similar soils: 5 percent
Gilford and similar soils: 5 percent
Goodell and similar soils: 5 percent
Selfridge and similar soils: 5 percent

Properties and Qualities of the Maumee Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 5.4 inches to a depth of 60 inches

Properties and Qualities of the Gumz Soil

Parent material: Sandy outwash over loamy till
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 5.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

MhaA—Maumee loamy fine sand, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Depressions and flats

Average Composition of Components

Maumee and similar soils: 80 percent
Gilford and similar soils: 5 percent
Gumz and similar soils: 5 percent
Morocco and similar soils: 5 percent
Newton and similar soils: 5 percent

Properties and Qualities of the Maumee Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 5.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

MhbA—Maumee mucky loamy fine sand, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions and flats

Average Composition of Components

Maumee and similar soils: 90 percent
Gilford and similar soils: 5 percent
Granby and similar soils: 5 percent

Properties and Qualities of the Maumee Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 5.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Medaryville Series

The Medaryville series consists of very deep, somewhat poorly drained soils on lake plains. These soils formed in loamy and sandy water-sorted materials and in the underlying lacustrine materials. Permeability is moderate in the loamy and sandy materials and slow or very slow in the underlying lacustrine materials. Slopes are 0 to 1 percent.

These soils are classified as sandy over loamy, mixed, semiactive, mesic Aquic Argiudolls.

Typical Pedon for the Series

Medaryville fine sandy loam, in a nearly level area in a cultivated field, at an elevation of 673 feet, in Pulaski County, Indiana, about 1.5 miles north and 1.5 miles east of Francesville; 1,250 feet west and 2,450 feet south of the northeast corner of sec. 34, T. 30 N., R. 4 W.; USGS North Judson Southeast topographic quadrangle; latitude 41 degrees 0 minutes 21.28 seconds north and longitude 86 degrees 51 minutes 29.12 seconds west; NAD 1927:

Ap—0 to 11 inches; very dark brown (10YR 2/2) fine sandy loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to weak medium granular; friable; few very fine roots throughout; few very fine low-continuity tubular pores; moderately acid; abrupt smooth boundary.

Bt1—11 to 17 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots throughout; few very fine low-continuity tubular pores; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation; common fine distinct grayish brown (10YR 5/2) iron oxide depletions; many distinct very dark brown (10YR 2/2) organic coats on faces of peds; slightly acid; clear wavy boundary.

Bt2—17 to 22 inches; dark yellowish brown (10YR 4/4) loamy fine sand; moderate medium subangular blocky structure; friable; few very fine roots throughout; few very fine low-continuity tubular pores; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common fine distinct grayish brown (10YR 5/2) iron oxide depletions; slightly acid; clear wavy boundary.

Bt3—22 to 28 inches; dark yellowish brown (10YR 4/4) loamy sand; moderate medium subangular blocky structure; friable; few very fine roots throughout; few very fine low-continuity tubular pores; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common fine distinct grayish brown (10YR 5/2) iron oxide depletions; few medium rounded very dark gray (10YR 3/1) soft iron-manganese nodules throughout; neutral; clear wavy boundary.

Bt4—28 to 32 inches; yellowish brown (10YR 5/6) loamy sand; moderate medium subangular blocky structure; friable; few very fine roots throughout; few very fine low-continuity tubular pores; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; many medium distinct light brownish gray (10YR 6/2) iron oxide depletions; neutral; clear wavy boundary.

BCg—32 to 36 inches; light brownish gray (10YR 6/2) fine sand; weak coarse subangular blocky structure; very friable; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation; neutral; abrupt wavy boundary.

2BC1—36 to 41 inches; light olive brown (2.5Y 5/3) silty clay; weak medium prismatic structure; firm; common fine faint light olive brown (2.5Y 5/4) and common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; many medium distinct olive gray (5Y 5/2) iron oxide depletions in the matrix; few medium rounded very dark gray (10YR 3/1) masses of iron-manganese accumulation throughout; lenses of light gray (10YR 7/2) fine sand less than 3 millimeters thick between bedding planes; strongly effervescent; moderately alkaline; gradual wavy boundary.

2BC2—41 to 60 inches; light olive brown (2.5Y 5/3) silty clay; weak coarse prismatic structure; firm; common distinct dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in root channels; many prominent gray (5Y 5/1) iron oxide depletions between peds; strongly effervescent; moderately alkaline; gradual wavy boundary.

2Cg—60 to 84 inches; grayish brown (2.5Y 5/2) silty clay; massive; firm; common medium prominent dark yellowish brown (10YR 4/4) masses of iron oxide accumulation; common medium distinct gray (5Y 5/1) iron oxide depletions; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon and the depth to carbonates range from 26 to 40 inches. The average content of silt plus twice the average clay content is less than 30 percent in the sandy part of the particle-size control section. The depth to the underlying lacustrine materials dominantly ranges from 30 to 40 inches. The Ap horizon and the A horizon, if it occurs, have hue of 10YR, value of 2 or 3, and chroma of 1 or 2. They are loam or fine sandy loam. The content of rock fragments ranges from 0 to 5 percent by volume. Reaction ranges from moderately acid to neutral.

Some pedons have an E or BE horizon. This horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 2 or 3. It is loam or fine sandy loam. The content of rock fragments ranges from 0 to 5 percent by volume. Reaction ranges from moderately acid to neutral.

The Bt horizon and the Btg horizon, if it occurs, have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. They are fine sandy loam, sandy loam, loamy fine sand, or loamy sand. The content of rock fragments ranges from 0 to 5 percent by volume. Reaction ranges from moderately acid to neutral.

The BC and BCg horizons, if they occur, have colors similar to those of the Bt horizon. They are fine sand, sand, or very fine sand. Reaction ranges from neutral to moderately alkaline.

The 2BC, 2BCg, 2C, and 2Cg horizons, if they occur, have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. They are silty clay loam or silty clay. The content of clay is 27 percent, and the content of sand is less than 20 percent. Reaction is slightly alkaline or moderately alkaline.

MhnA—Medaryville fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Lake plains
Position on the landform: Swells

Average Composition of Components

Medaryville and similar soils: 80 percent
Radioville and similar soils: 7 percent
Milford and similar soils: 5 percent
Strole and similar soils: 5 percent
Whiskerville and similar soils: 3 percent

Properties and Qualities of the Medaryville Soil

Parent material: Loamy and/or sandy outwash over clayey lacustrine deposits
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 7.9 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Mermill Series

The Mermill series consists of very deep, very poorly drained soils on lake plains and till plains. These soils formed in loamy water-sorted material 20 to 40 inches thick and in the underlying till.

Permeability is moderate in the loamy material and slow or very slow in the underlying material. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, active, mesic Mollic Epiaqualfs.

Typical Pedon for the Series

Mermill loam, on a slope of less than 1 percent, in a cultivated field at an elevation of 749 feet, in Hancock County, Ohio, about 1.75 miles northeast of McComb; 1,520 feet north and 2,180 feet east of the southwest corner of sec. 18, T. 2 N., R. 10 E.; USGS Hoytville topographic quadrangle; latitude 41 degrees 7 minutes 41.8 seconds north and longitude 83 degrees 45 minutes 25.9 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak medium and coarse subangular blocky structure parting to moderate fine and medium granular; friable; common fine roots; 1 percent pebbles; moderately acid; clear wavy boundary.

Btg1—9 to 14 inches; gray (10YR 5/1) clay loam; weak fine and medium subangular blocky structure; friable; few fine roots; common faint gray (10YR 5/1) clay films (iron depletions) on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings on vertical faces of peds; common medium distinct yellowish brown (10YR 5/6) and few fine and medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; common fine and medium very dark grayish brown (10YR 3/2) iron and manganese oxide concretions in the matrix; 1 percent pebbles; neutral; gradual wavy boundary.

Btg2—14 to 21 inches; grayish brown (2.5Y 5/2) clay loam; weak medium subangular blocky structure; friable; few fine roots; common distinct gray (10YR 5/1) clay films (iron depletions) on faces of peds; common medium prominent yellowish brown (10YR 5/6) and few fine and medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; common medium distinct gray (10YR 5/1) iron depletions in the matrix; common fine and medium very dark grayish brown (10YR 3/2) iron and manganese oxide concretions in the matrix; 1 percent pebbles; neutral; gradual wavy boundary.

Btg3—21 to 28 inches; grayish brown (2.5Y 5/2) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; strata of fine sandy loam; common distinct gray (10YR 5/1) clay films (iron depletions) on faces of peds; common medium distinct gray (10YR 5/1) iron depletions in the matrix; common fine and medium prominent yellowish brown (10YR 5/6) and common medium and coarse distinct brown (10YR 5/3) masses of iron accumulation in the matrix; common fine and medium very dark grayish brown (10YR 3/2) iron and manganese oxide concretions in the matrix; 1 percent pebbles; neutral; clear smooth boundary.

2Btg4—28 to 36 inches; grayish brown (10YR 5/2) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common faint gray (10YR 5/1) clay films (iron depletions) on faces of peds; many medium and coarse distinct dark yellowish brown (10YR 4/4) and common fine and medium distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; common fine and medium very dark grayish brown (10YR 3/2) iron and manganese oxide concretions in the matrix; few medium light gray (10YR 7/2) calcium carbonate concretions in the matrix; 5 percent pebbles; strongly effervescent; slightly alkaline; gradual wavy boundary.

2BC—36 to 57 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium and coarse subangular blocky structure; firm; few fine roots in the upper part; common distinct gray (10YR 5/1) coatings (iron depletions) on faces of peds; common fine and medium distinct gray (10YR 5/1) iron depletions in the matrix; common medium and coarse distinct yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; few medium light gray (10YR 7/2) calcium carbonate concretions in the matrix; 5 percent pebbles; strongly effervescent; moderately alkaline; gradual irregular boundary.

2C—57 to 80 inches; brown (10YR 4/3) clay loam; massive; firm; few distinct gray (10YR 5/1) coatings (iron depletions) on vertical faces of partings; common fine and medium distinct gray (10YR 5/1) iron depletions and few medium distinct yellowish brown (10YR 5/6) masses of iron accumulation oriented along fracture planes; 5 percent pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of soil development typically ranges from 24 to 60 inches. Soil development typically extends into the till. The depth to the base of the argillic horizon ranges from 21 to 42 inches. The depth to carbonates ranges from 24 to 50 inches. The depth to till ranges from 20 to 40 inches. Rock fragments are glacial pebbles, primarily of limestone, dolomite, and crystalline lithology.

The Ap horizon has hue of 10YR, value of 2 or 3 (5 or less dry), and chroma of 1 or 2. It is sandy clay loam, silt loam, loam, fine sandy loam, clay loam, or silty clay loam. The content of rock fragments ranges from 0 to 10 percent by volume. Reaction ranges from moderately acid to neutral.

Some pedons have a BEg horizon.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is loam, sandy clay loam, or clay loam. Some pedons have thin subhorizons of sandy clay to fine sandy loam. The content of rock fragments ranges from 0 to 10 percent by volume. Reaction ranges from moderately acid to neutral.

The 2Btg, 2Bt, 2BCg, or 2BC horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 4. It is clay, silty clay, clay loam, or silty clay loam. The content of clay ranges from 27 to 42 percent. The content of rock fragments ranges from 1 to 10 percent by volume. Reaction ranges from neutral to moderately alkaline.

The 2C or 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 6. It has textures and rock fragment content similar to those of the 2B horizon. Reaction is slightly alkaline or moderately alkaline. The profile contains carbonates.

Metea Series

The Metea series consists of very deep, well drained soils on moraines and till plains. These soils formed in wind- or water-laid sandy material and the underlying glacial till. Permeability is rapid in the upper sandy material and moderate or moderately slow in the lower loamy material. Slopes range from 1 to 5 percent.

These soils are classified as loamy, mixed, active, mesic Arenic Hapludalfs.

Typical Pedon for the Series

Metea loamy fine sand, on a slope of 4 percent, in a cultivated field at an elevation of 800 feet, in Marshall County, Indiana, about 4 miles south and 3 miles west of Plymouth; 700 feet south and 1,600 feet west of the center of sec. 25, T. 33 N., R. 1 E.; USGS Plymouth topographic quadrangle; latitude 41 degrees 16 minutes 45.4 seconds north and longitude 86 degrees 21 minutes 46.3 seconds west; NAD 1927:

Ap—0 to 9 inches; brown (10YR 4/3) loamy fine sand, light yellowish brown (10YR 6/4) dry; weak fine granular structure; very friable; moderately acid; abrupt smooth boundary.

E—9 to 28 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; moderately acid; abrupt smooth boundary.

Bt1—28 to 32 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; friable; common brown (10YR 4/3) clay bridges between sand grains; 3 percent gravel; moderately acid; clear wavy boundary.

2Bt2—32 to 44 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; thin discontinuous brown (10YR 4/3) clay films on faces of peds; 4 percent gravel; moderately acid; clear wavy boundary.

2C—44 to 80 inches; brown (10YR 5/3) loam; massive; friable; 4 percent gravel; slightly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 40 to 60 inches. The thickness of the sandy material ranges from 20 to 40 inches.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Dry value is more than 5.5. This horizon is loamy sand, loamy fine sand, sand, or fine sand. Reaction ranges from moderately acid to neutral.

The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is loamy sand, loamy fine sand, sand, or fine sand. Reaction ranges from strongly acid to slightly acid.

The Bt horizon has hue of 10YR and value and chroma of 4 to 6. It is sandy loam, fine sandy loam, or sandy clay loam. The content of clay ranges from 12 to 22 percent. The content of gravel ranges from 0 to 5 percent. Reaction is moderately acid or slightly acid.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 8. It is clay loam or loam. The content of clay ranges from 24 to 35 percent. The content of silt is less than 60 percent in all 2Bt horizons. The content of gravel ranges from 1 to 10 percent. This part of the profile dominantly is moderately acid or slightly acid, but reaction ranges to neutral in the lower part in pedons in which there is more than one horizon.

The 2C horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 8. The content of clay ranges from 15 to 24 percent. Reaction is slightly alkaline or moderately alkaline.

MlwB—Metea-Moon loamy sands, 1 to 5 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Metea and similar soils: 50 percent
Moon and similar soils: 35 percent
Denham and similar soils: 5 percent
Miami and similar soils: 5 percent
Selfridge and similar soils: 5 percent

Properties and Qualities of the Metea Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity: About 7.1 inches to a depth of 60 inches

Properties and Qualities of the Moon Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Miami Series

The Miami series consists of very deep, moderately well drained soils on moraines and till plains. These soils formed in as much as 18 inches of loess and in calcareous loamy glacial till. They are moderately deep to dense till. Permeability is moderate in the surface layer and the subsoil and slow or very slow in the underlying material. Slopes range from 2 to 10 percent.

These soils are classified as fine-loamy, mixed, active, mesic Oxyaquic Hapludalfs.

Typical Pedon for the Series

Miami silt loam, on a convex slope of 3 percent, in a cultivated field in Hendricks County, Indiana, $3^{1}/_{2}$ miles east of Danville; 800 feet west and 300 feet south of the northeast corner of sec. 6, T. 15 N., R. 1 E.; USGS Brownsburg topographic quadrangle; latitude 39 degrees 46 minutes 31.54 seconds north and longitude 86 degrees 27 minutes 37.23 seconds west; NAD 1927:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; neutral; abrupt smooth boundary.

Bt1—8 to 13 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds and occurring as linings of some voids; 1 percent pebbles; moderately acid; abrupt wavy boundary.

2Bt2—13 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; strong coarse subangular blocky structure; firm; many distinct continuous brown (7.5YR 4/4) clay films on faces of peds and occurring as linings of some voids; 2 percent pebbles; strongly acid; clear wavy boundary.

2Bt3—23 to 31 inches; dark yellowish brown (10YR 4/4) clay loam; moderate coarse subangular blocky structure; firm; many distinct discontinuous brown (7.5YR 4/4) clay films on faces of peds and occurring as linings of some voids; common fine and medium rounded very dark gray (10YR 3/1) masses of iron and manganese accumulation in the matrix; 5 percent pebbles; moderately acid; clear wavy boundary.

2BCt—31 to 36 inches; brown (10YR 4/3) loam; weak coarse prismatic structure; friable; common distinct discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; common medium distinct light brownish gray (10YR 6/2) irregularly shaped iron depletions in the matrix; common fine and medium irregular very dark gray (10YR 3/1) masses of iron and manganese accumulation in the matrix; 5 percent pebbles; slightly effervescent; slightly alkaline; clear irregular boundary.

2Cd—36 to 80 inches; brown (10YR 5/3) loam; massive; very firm; common medium distinct grayish brown (10YR 5/2) irregularly shaped iron depletions in the matrix; few fine irregular very dark gray (10YR 3/1) masses of iron and manganese accumulation in the matrix; 5 percent pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 24 to 40 inches. The depth to free carbonates ranges from 20 to 40 inches. Thickness of the loess ranges from 0 to 18 inches.

The upper part of the control section (Ap or A horizon) has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. When dry, it has hue of 10YR, value of 6, and chroma of 2 or 3. Some pedons have an E horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The Ap or A horizon is loam, silt loam, fine sandy loam, sandy loam, silty clay loam, or clay loam. The content of rock fragments ranges from 0 to 5 percent. Reaction ranges from moderately acid to neutral.

The next part of the control section (Bt and 2Bt horizons) has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is silty clay loam or clay loam in the upper part and clay loam in the lower part. It averages 27 to 35 percent clay and 15 to 40 percent sand. The content of rock fragments ranges from 1 to 10 percent. Reaction ranges from slightly acid to strongly acid in the upper part and from neutral to strongly acid in the lower part.

The third part of the control section (BCt, 2BCt, and/or CB horizon) has hue of 10YR, 7.5YR, or 2.5Y, value of 4 to 6, and chroma of 3 or 4. It is loam or fine sandy loam and averages 15 to 25 percent clay and 40 to 55 percent sand. The content of rock fragments ranges from 1 to 10 percent. Reaction is neutral or slightly alkaline.

The lower part of the control section (2Cd horizon) has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is loam or fine sandy loam and averages 10 to 20 percent clay and 45 to 60 percent sand. The content of rock fragments ranges from 1 to 10 percent. The calcium carbonate equivalent ranges from 15 to 50 percent. Reaction is slightly alkaline or moderately alkaline.

MmyC2—Miami fine sandy loam, 5 to 10 percent slopes, moderately eroded

Setting

Landform: Till plains
Position on the landform: Knolls and backslopes

Average Composition of Components

Miami and similar soils: 75 percent
Riddles and similar soils: 10 percent
Metea and similar soils: 5 percent
Wawasee and similar soils: 5 percent
Williamstown and similar soils: 5 percent

Properties and Qualities of the Miami Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 5 to 10 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Moderately well drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

MnzB—Miami-Williamstown fine sandy loams, 2 to 5 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells and backslopes

Average Composition of Components

Miami and similar soils: 40 percent
Williamstown and similar soils: 35 percent
Metea and similar soils: 10 percent
Riddles and similar soils: 10 percent
Moon and similar soils: 5 percent

Properties and Qualities of the Miami Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 2 to 5 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Moderately well drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Properties and Qualities of the Williamstown Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 2 to 5 percent
Depth to restrictive feature: 24 to 40 inches to dense material

Drainage class: Moderately well drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Milford Series

The Milford series consists of very deep, poorly drained and very poorly drained soils on glacial lake plains. These soils formed in lacustrine sediments. Permeability is moderately slow. Slopes are 0 to 1 percent.

These soils are classified as fine, mixed, superactive, mesic Typic Endoaquolls.

Typical Pedon for the Series

Milford silty clay loam, on a southeast-facing slope of 1 percent, in a cultivated field at an elevation of 643 feet, in Iroquois County, Illinois, about 2.5 miles southeast of Gilman; 1,450 feet north and 70 feet east of the southwest corner of sec. 4, T. 26 N., R. 14 W.; USGS Gilman topographic quadrangle; latitude 40 degrees 45 minutes 24 seconds north and longitude 87 degrees 57 minutes 29 seconds west; NAD 1927:

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine and fine subangular and angular blocky structure; firm; many fine roots; slightly acid; abrupt smooth boundary.

A—9 to 18 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; moderate and strong very fine subangular blocky structure; firm; common fine roots; slightly acid; clear smooth boundary.

BA—18 to 22 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; moderate fine and medium angular blocky structure; very firm; common fine roots; many distinct black (10YR 2/1) organic coatings on faces of peds; common medium prominent olive brown (2.5Y 4/4) masses of iron accumulation in the matrix; common medium distinct dark grayish brown (2.5Y 4/2) iron depletions in the matrix; neutral; clear smooth boundary.

Bg1—22 to 31 inches; gray (5Y 5/1) silty clay loam; moderate medium and coarse prismatic structure parting to moderate medium and coarse angular and subangular blocky; very firm; common fine roots; many faint dark gray (5Y 4/1) pressure faces on faces of peds; few fine black (N 2.5/0) iron and manganese oxide concretions throughout; many medium prominent dark yellowish brown (10YR 4/4) masses of iron accumulation in the matrix; many medium distinct grayish brown (2.5Y 5/2) iron depletions in the matrix; neutral; clear smooth boundary.

Bg2—31 to 42 inches; gray (5Y 5/1) clay loam; moderate coarse prismatic structure parting to moderate medium and coarse angular blocky; very firm; few fine roots; common medium prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear smooth boundary.

Bg3—42 to 50 inches; dark gray (5Y 4/1) silty clay loam stratified with thin bands of clay loam; moderate coarse prismatic structure parting to moderate coarse subangular and angular blocky; firm; few fine roots; many medium prominent dark yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

Cg—50 to 60 inches; gray (5Y 5/1) clay loam stratified with bands of fine sandy loam, silty clay loam, and silty clay; massive; firm; few fine roots; many coarse prominent yellowish brown (10YR 5/4 and 5/8) masses of iron accumulation in the matrix; neutral.

Range in Characteristics

The depth to the base of the cambic horizon ranges from 36 to 60 inches. The mollic epipedon is 10 to 24 inches thick. In some pedons it does not include the upper part of the B horizon. The average content of clay in the particle-size control section ranges from 35 to 42 percent. The series control section dominantly is slightly acid or neutral but ranges to moderately acid in the upper part and to moderately alkaline in the lower part. Carbonates are in the lower $^{1}/_{4}$ of the control section in some pedons. The content of rock fragments ranges from 0 to 5 percent in the control section.

The upper part of the series control section (A, Ap, and/or AB horizon) has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 2. It commonly is silty clay loam or clay loam, but in some pedons it is silty clay or clay. Some pedons have 8 to 20 inches of silt loam overwash over the genetic A horizon.

The next part of the series control section (Bg, Btg, and/or BCg horizon) has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. Hue of 10YR and neutral colors are less common than the others. The texture is silty clay loam or silty clay in the upper part of this portion of the profile and typically grades to clay loam or silty clay loam in the lower part where it is stratified. In some pedons the strata are thin and range from clay to fine sandy loam. Some pedons have organic coatings, pressure faces, or distinct clay films on faces of peds in some or all subhorizons.

The lower part of the series control section (Cg horizon) has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. Hue of 10YR and neutral colors are less common than the others. The texture is dominantly clay loam or silty clay loam with thin layers ranging from sandy loam to clay.

MouA—Milford silty clay loam, 0 to 1 percent slopes

Setting

Landform: Lake plains
Position on the landform: Depressions

Average Composition of Components

Milford and similar soils: 85 percent
Radioville and similar soils: 5 percent
Rensselaer and similar soils: 5 percent
Whitepost and similar soils: 5 percent

Properties and Qualities of the Milford Soil

Parent material: Clayey lacustrine deposits
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 10.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Monon Series

The Monon series consists of deep, poorly drained and very poorly drained soils on outwash plains or lake plains. These soils formed in loamy and sandy sediments over limestone bedrock. They are moderately rapidly permeable in the surface layer and the subsoil and very slowly permeable or impermeable in the limestone substratum. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, superactive, mesic Typic Endoaquolls.

Typical Pedon for the Series

Monon fine sandy loam, in a nearly level area on a slope of less than 1 percent, in a cultivated field at an elevation of 673 feet, in Pulaski County, Indiana, about 1 mile west and 2 miles north of Monon; 480 feet east and 1,250 feet south of the northwest corner of sec. 5, T. 28 N., R. 4 W.; USGS Francesville topographic quadrangle; latitude 40 degrees 54 minutes 32 seconds north and longitude 86 degrees 54 minutes 35 seconds west; NAD 1927:

Ap—0 to 10 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; common fine and very fine roots throughout; 1 percent pebbles; slightly acid; abrupt smooth boundary.

Bg1—10 to 13 inches; dark gray (10YR 4/1) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots throughout; many distinct continuous black (10YR 2/1) organic coatings in root channels and pores and on faces of peds; common fine distinct yellowish brown (10YR 5/4) masses of iron oxide accumulation in the matrix; 1 percent pebbles; slightly acid; clear wavy boundary.

Bg2—13 to 18 inches; dark gray (10YR 4/1) fine sandy loam; weak coarse subangular blocky structure; friable; few very fine roots throughout; many distinct continuous very dark gray (10YR 3/1) organic coats in root channels and pores and on faces of peds; moderate medium distinct yellowish brown (10YR 5/4 and 5/6) masses of iron oxide accumulation in the matrix; 1 percent pebbles; slightly acid; clear wavy boundary.

Bg3—18 to 26 inches; gray (10YR 5/1) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots throughout; common distinct discontinuous very dark gray (10YR 3/1) organic coats in root channels and pores and on faces of peds; moderate medium distinct yellowish brown and strong brown (10YR 5/4 and 7.5YR 5/6) masses of iron oxide accumulation in the matrix; 3 percent pebbles; neutral; clear wavy boundary.

Bg4—26 to 42 inches; gray (10YR 6/1), stratified fine sandy loam, loam, and gravelly sandy loam; weak coarse subangular blocky structure; friable; moderate medium and coarse distinct yellowish brown (10YR 5/6 and 5/8) masses of iron oxide accumulation in the matrix; 25 percent pebbles; neutral; clear wavy boundary.

R—42 inches; white (10YR 8/1), unweathered limestone bedrock; indurated; strongly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of the cambic horizon ranges from 24 to 50 inches. The depth to the top of the bedrock is commonly 40 to 60 inches but ranges from 40 to 80 inches. Reaction ranges from moderately acid to neutral.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2, or it is neutral in hue and has chroma of 0. It is fine sandy loam, loam, sandy loam, mucky sandy loam, or mucky fine sandy loam. The content of fine gravel ranges from 0 to 5 percent by volume.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2 and contains redoximorphic features. It is dominantly fine sandy loam, sandy loam, gravelly fine sandy loam, or gravelly sandy loam, but in some pedons it has strata of loamy sand, fine sand, sand, or loam. The content of fine gravel ranges from 0 to 5 percent, by volume, in the upper part and from 0 to 35 percent in the lower part.

The R layer has hue of 10YR, value of 7 or 8, and chroma of 1 or 2. It is very strongly cemented or indurated.

Moon Series

The Moon series consists of very deep, moderately well drained soils on moraines and till plains. These soils formed in wind- or water-laid sandy material and the underlying glacial till. Permeability is rapid in the upper sandy material and moderate or moderately slow in the lower loamy material. Slopes range from 0 to 5 percent.

These soils are classified as fine-loamy, mixed, active, mesic Oxyaquic Hapludalfs.

Typical Pedon for the Series

Moon loamy sand, on a gentle slope of 3 percent, in a cultivated field at an elevation of 731 feet, in Pulaski County, Indiana, about 4.5 miles south of Monterey; 1,912 feet east and 1,595 feet south of the northwest corner of sec. 36, T. 31 N., R. 1 W.; USGS Kewanna topographical quadrangle; latitude 41 degrees 5 minutes 39.4 seconds north and longitude 86 degrees 28 minutes 41.3 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many medium and common fine and very fine roots throughout; 5 percent gravel; neutral; abrupt smooth boundary.

E1—9 to 17 inches; dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure; friable; common medium roots throughout; 9 percent gravel; neutral; clear wavy boundary.

E2—17 to 23 inches; yellowish brown (10YR 5/4) sand; weak medium subangular blocky structure; friable; common medium roots throughout; common medium faint dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in the matrix; 12 percent gravel; neutral; clear wavy boundary.

2Bt1—23 to 31 inches; brown (10YR 4/3) sandy clay loam; moderate medium subangular blocky structure; firm; common medium roots between peds; faint discontinuous brown (10YR 4/3) clay films on faces of peds and in pores; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; 14 percent gravel; neutral; clear wavy boundary.

2Bt2—31 to 35 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate medium subangular blocky structure; firm; common medium roots between peds; distinct continuous dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common fine distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; few black (N 2/0) masses of iron-manganese accumulations; 6 percent gravel; neutral; clear wavy boundary.

2Bt3—35 to 45 inches; brown (10YR 5/3) loam; moderate medium subangular blocky structure; firm; few medium roots between peds; distinct continuous dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; many medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; 6 percent gravel; neutral; clear wavy boundary.

2BCtk—45 to 57 inches; brown (10YR 5/3) loam; weak coarse prismatic structure; firm; few medium roots between peds; faint discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; many medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; many medium faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; light gray (10YR 7/2) masses of lime on vertical faces of peds; 7 percent gravel; slightly effervescent; slightly alkaline; clear wavy boundary.

2C—57 to 80 inches; yellowish brown (10YR 5/4) loam; massive; firm; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; 8 percent gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon and the depth to carbonates range from 40 to 60 inches. The depth to redoximorphic depletions with chroma of 2 or less ranges from 30 to 40 inches. The thickness of the sandy material ranges from 20 to 40 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is loamy sand, loamy fine sand, sand, or fine sand. The content of gravel ranges from 0 to 14 percent by volume. Reaction ranges from moderately acid to neutral.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is loamy sand, loamy fine sand, fine sand, or sand. The content of gravel ranges from 0 to 14 percent by volume. Reaction ranges from very strongly acid to neutral.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It has redoximorphic features with hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 8. It is sandy loam, sandy clay loam, clay loam, or loam. The content of clay ranges from 15 to 34 percent. The content of gravel ranges from 0 to 14 percent by volume. Reaction ranges from strongly acid to neutral.

The 2BC horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It has redoximorphic features with hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 8. It is fine sandy loam or loam. The content of clay ranges from 12 to 25 percent. The content of rock fragments ranges from 0 to 10 percent by volume. Reaction ranges from slightly acid to slightly alkaline.

The 2C horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 8. It has redoximorphic features with hue of 10YR, value of 5 or 6, and chroma of 2 to 8. It is fine sandy loam or loam. The content of clay ranges from 10 to 20 percent. The content of rock fragments ranges from 0 to 10 percent by volume. Reaction is slightly alkaline or moderately alkaline.

MtoA—Moon-Ormas loamy sands, 0 to 1 percent slopes

Setting

Landform: Till plains and outwash plains
Position on the landform: Swells

Average Composition of Components

Moon and similar soils: 45 percent
Ormas and similar soils: 35 percent
Bronson and similar soils: 10 percent
Metea and similar soils: 5 percent
Winamac and similar soils: 5 percent

Properties and Qualities of the Moon Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.5 inches to a depth of 60 inches

Properties and Qualities of the Ormas Soil

Parent material: Sandy and/or loamy outwash over sandy and gravelly outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity: About 5.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

MtoB—Moon-Ormas loamy sands, 1 to 5 percent slopes

Setting

Landform: Till plains and outwash plains
Position on the landform: Swells and backslopes

Average Composition of Components

Moon and similar soils: 45 percent
Ormas and similar soils: 30 percent
Metea and similar soils: 15 percent
Brems and similar soils: 5 percent
Bronson and similar soils: 5 percent

Properties and Qualities of the Moon Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.5 inches to a depth of 60 inches

Properties and Qualities of the Ormas Soil

Parent material: Sandy and/or loamy outwash over sandy and gravelly outwash
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity: About 5.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

MtpA—Moon-Selfridge complex, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Moon and similar soils: 45 percent
Selfridge and similar soils: 35 percent
Metea and similar soils: 10 percent
Brems and similar soils: 5 percent
Williamstown and similar soils: 5 percent

Properties and Qualities of the Moon Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.5 inches to a depth of 60 inches

Properties and Qualities of the Selfridge Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Morocco Series

The Morocco series consists of very deep, somewhat poorly drained, rapidly permeable soils on outwash plains and lake plains. These soils formed in sandy outwash. Slopes are 0 to 1 percent.

These soils are classified as mixed, mesic Aquic Udipsamments.

Typical Pedon for the Series

Morocco loamy fine sand, on a slope of 0.5 percent, in a cultivated field at an elevation of 687 feet, in Jasper County, Indiana, 4 miles southwest of Demotte; 270 feet north and 950 feet west of the southeast corner of sec. 7, T. 31 N., R. 7 W.; USGS Shelby topographic quadrangle; latitude 41 degrees 8 minutes 43.6 seconds north and longitude 87 degrees 15 minutes 35.9 seconds west; NAD 1927:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy fine sand, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; common fine and very fine roots; very strongly acid; abrupt smooth boundary.

Bw1—9 to 14 inches; light yellowish brown (10YR 6/4) loamy fine sand; single grain; loose; few very fine roots; common medium distinct light gray (10YR 7/2) iron oxide depletions in the matrix; few fine prominent strong brown (7.5YR 5/8) masses of iron oxide accumulation in the matrix; very strongly acid; clear wavy boundary.

Bw2—14 to 22 inches; very pale brown (10YR 7/3) loamy fine sand; single grain; loose; few very fine roots; common medium prominent brownish yellow (10YR 6/8) masses of iron oxide accumulation in the matrix; very strongly acid; clear wavy boundary.

Bg—22 to 35 inches; light gray (10YR 7/2) fine sand; single grain; loose; many coarse prominent yellowish red (5YR 5/8) masses of iron oxide accumulation in the matrix; very strongly acid; clear wavy boundary.

B´w1—35 to 50 inches; very pale brown (10YR 7/4) fine sand; single grain; loose; common medium distinct light gray (10YR 7/2) iron oxide depletions in the matrix; common medium prominent brownish yellow (10YR 6/8) masses of iron oxide accumulation in the matrix; very strongly acid; gradual wavy boundary.

B´w2—50 to 60 inches; very pale brown (10YR 7/4) fine sand; single grain; loose; common medium distinct light gray (10YR 7/2) iron oxide depletions in the matrix; common medium prominent brownish yellow (10YR 6/8) masses of iron oxide accumulation in the matrix; strongly acid; clear wavy boundary.

C—60 to 80 inches; pale brown (10YR 6/3) sand; single grain; loose; common medium faint light brownish gray (10YR 6/2) iron oxide depletions in the matrix; common medium distinct brownish yellow (10YR 6/6) masses of iron oxide accumulation in the matrix; strongly acid.

Range in Characteristics

The depth to the C horizon ranges from 24 to 80 inches. Iron depletions occur within a depth of 24 inches.

The Ap or A horizon has hue of 10YR, value of 2 to 6, and chroma of 1 to 4. Dry value is 6 or more where the A or Ap horizon is 6 or more inches thick. This horizon is loamy fine sand, fine sand, loamy sand, or sand. The content of pebbles is 0 to 1 percent. Reaction ranges from very strongly acid to neutral, depending on liming history.

Some pedons have an E horizon. This horizon has characteristics similar to those of the A horizon, but it has hue of 10YR, value of 4 to 6, and chroma of 3 or 4.

The Bw, Bg, or B´w horizon has hue of 5YR, 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 1 to 8. It is fine sand, sand, loamy fine sand, or loamy sand. The content of pebbles ranges from 0 to 5 percent. Reaction ranges from very strongly acid to moderately acid.

The C horizon has hue of 5YR, 7.5YR, 10YR, or 2.5Y, value of 5 to 8, and chroma of 1 to 4. It is fine sand or sand. Reaction ranges from very strongly acid to moderately acid. The content of pebbles ranges from 0 to 7 percent.

MupA—Morocco loamy fine sand, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Swells

Average Composition of Components

Morocco and similar soils: 85 percent
Brady and similar soils: 5 percent
Brems and similar soils: 5 percent
Newton and similar soils: 5 percent

Properties and Qualities of the Morocco Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 5.0 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Moston Series

The Moston series consists of very deep, very poorly drained soils on outwash plains, lake plains and terraces, flood plains, moraines, and till plains. These soils formed in herbaceous organic material over coprogenous material (sedimentary peat) and sand deposits. Permeability is moderately slow to moderately rapid in the herbaceous organic material, slow in the coprogenous material, and rapid in the underlying sand. Slopes are 0 to 1 percent.

These soils are classified as coprogenous, euic, mesic Limnic Haplosaprists.

Typical Pedon for the Series

Moston muck, on a slope of less than 1 percent, in a cultivated field in Pulaski County, Indiana; 1,590 feet east and 1,750 feet south of the northwest corner of sec. 9, T. 31 N., R. 1 W.; USGS Bass Lake topographic quadrangle; latitude 41 degrees 9 minutes 7.9 seconds north and longitude 86 degrees 32 minutes 18.9 seconds west; NAD 1927; UTM, Easting 0538719, Northing 4555735:

Op—0 to 8 inches; muck, black (N 2.5/0) broken faced and rubbed; a trace of fiber unrubbed and rubbed; moderate medium granular structure; friable; common very fine and fine roots; moderately acid; abrupt smooth boundary.

Oa1—8 to 15 inches; muck, black (N 2.5/0) broken faced and rubbed; a trace of fiber unrubbed and rubbed; weak medium subangular blocky structure; friable; common very fine and fine roots; strongly acid; clear wavy boundary.

Oa2—15 to 24 inches; muck, dark brown (10YR 3/3) broken faced and rubbed; about 50 percent fiber, 5 percent rubbed; moderate thick platy structure; friable; common very fine and fine roots; neutral; clear wavy boundary.

Lco1—24 to 30 inches; very dark gray (10YR 3/1) coprogenous silt loam; about 5 percent fiber, a trace rubbed; massive; friable; neutral; clear wavy boundary.

Lco2—30 to 48 inches; very dark grayish brown (2.5Y 3/2) coprogenous silt loam; about 15 percent fiber, a trace rubbed; massive; friable; neutral; clear wavy boundary.

2Cg—48 to 80 inches; very dark gray (2.5Y 5/1) sand; single grain; loose; slightly effervescent; slightly alkaline.

Range in Characteristics

The thickness of the herbaceous organic layers and the depth to coprogenous material (sedimentary peat) range from 16 to 45 inches. Fibers are derived primarily from herbaceous plants, although some pedons contain less than 15 percent, by volume, twigs and small wood fragments. The depth to the underlying sand ranges from 21 to 51 inches.

The Op horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 2, or it is neutral in hue and has value of 2.5. Reaction ranges from very strongly acid to neutral.

The Oa horizon has hue of 7.5YR or 10YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 3. It is dominantly muck (sapric material), but some pedons have layers of mucky peat (hemic material) as much as 10 inches thick. Reaction ranges from very strongly acid to neutral.

The Lco horizon has hue of 10YR to 5Y, value of 2 to 5, and chroma of 1 to 3. It is coprogenous silt loam or coprogenous silty clay loam. Reaction ranges from moderately acid to slightly alkaline. Free carbonates occur in some pedons. The Lco horizon is slightly plastic. It shrinks upon drying and forms hard clods that are difficult to re-wet.

The 2Cg horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2. It is loamy sand, fine sand, sand, or coarse sand or the gravelly analogs of these textures The content of rock fragments ranges from 0 to 25 percent. Reaction ranges from neutral to moderately alkaline.

MvhAN—Moston muck, drained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Moston and similar soils: 80 percent
Ackerman and similar soils: 10 percent
Muskego and similar soils: 5 percent
Toto and similar soils: 5 percent

Properties and Qualities of the Moston Soil

Parent material: Herbaceous organic material over coprogenous material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 15.1 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

MvhAU—Moston muck, undrained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Moston and similar soils: 75 percent
Ackerman and similar soils: 10 percent
Muskego and similar soils: 5 percent
Toto and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Moston Soil

Parent material: Herbaceous organic material over coprogenous material over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 15.1 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

Muskego Series

The Muskego series consists of very deep, very poorly drained soils that formed in herbaceous organic material over coprogenous limnic material (sedimentary peat). These soils are mainly on glacial lake plains and flood plains. Permeability is moderate or moderately rapid in the herbaceous organic material and slow in the coprogenous material. Slopes are 0 to 1 percent.

These soils are classified as coprogenous, euic, mesic Limnic Haplosaprists.

Typical Pedon for MLRA 111

Muskego muck, 0 to 1 percent slopes, drained, in a cultivated field in Elkhart County, Indiana; 2,507 feet south and 275 feet west of the northeast corner of sec. 6, T. 36 N., R. 5 E.; USGS Foraker topographic quadrangle; latitude 41 degrees 36 minutes 7 seconds north and longitude 85 degrees 59 minutes 5 seconds west; NAD 1927:

Op—0 to 9 inches; muck, black (N 2.5/0) broken face and rubbed; about 5 percent fiber, less than 1 percent rubbed; moderate fine granular structure; very friable; many very fine and fine roots throughout; slightly acid; abrupt smooth boundary.

Oa1—9 to 21 inches; muck, brown (7.5YR 4/4) broken face, black (N 2.5/0) after exposure to air; about 5 percent fiber, less than 1 percent rubbed; moderate thin platy structure; very firm; common very fine and fine roots between peds; slightly acid; clear smooth boundary.

Oa2—21 to 27 inches; muck, dark gray (10YR 4/1) broken face, black (N 2.5/0) after exposure to air; about 15 percent fiber unrubbed, 2 percent rubbed; weak thin platy structure; friable; common very fine and fine roots between peds; slightly acid; clear smooth boundary.

Lco1—27 to 35 inches; weak red (2.5Y 4/2) coprogenous loamy coarse sand; about 5 percent fiber, 5 percent rubbed; massive; very friable; neutral; clear smooth boundary.

Lco2—35 to 54 inches; dark grayish brown (2.5Y 4/2) coprogenous sandy loam; massive; very friable; neutral; clear smooth boundary.

Lco3—54 to 70 inches; olive gray (5Y 4/2) coprogenous silty clay loam, dark gray (5Y 4/1) after exposure to air; massive; very friable; neutral; clear smooth boundary.

Lco4—70 to 80 inches; dark gray (5Y 4/1) coprogenous silty clay; massive; very friable; neutral.

Range in Characteristics

The thickness of the herbaceous organic layers and the depth to coprogenous material (sedimentary peat) range from 16 to 51 inches. Fibers are derived primarily from herbaceous plants, but some pedons contain less than 15 percent, by volume, twigs and small wood fragments

The Op horizon has hue of 10YR, value of 2, and chroma of 1 or 2, or it is neutral in hue and has value of 2.5. Reaction ranges from moderately acid to neutral.

The Oa horizon has hue of 7.5YR or 10YR, value of 2 to 3, and chroma of 1 to 3, or it is neutral in hue and has value of 2.5. It is dominantly muck (sapric material). Reaction ranges from moderately acid to neutral.

The Lco horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1 to 3. It ranges from coprogenous loamy coarse sand to coprogenous silty clay. Reaction ranges from neutral to moderately alkaline. Free carbonates occur in some pedons. The Lco horizon is slightly plastic. It shrinks upon drying and forms hard clods that are difficult to re-wet.

MwzAN—Muskego muck, drained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Muskego and similar soils: 75 percent
Houghton and similar soils: 10 percent
Moston and similar soils: 10 percent
Palms and similar soils: 5 percent

Properties and Qualities of the Muskego Soil

Parent material: Herbaceous organic material over coprogenous material
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 17.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

MwzAU—Muskego muck, undrained, 0 to 1 percent slopes

Setting

Landform: Lake plains, till plains, and outwash plains
Position on the landform: Depressions

Average Composition of Components

Muskego and similar soils: 70 percent
Houghton and similar soils: 10 percent
Moston and similar soils: 10 percent
Palms and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Muskego Soil

Parent material: Herbaceous organic material over coprogenous material
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 17.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Navunon Series

The Navunon series consists of deep, poorly drained soils in depressions on till plains. These soils formed in glacial till overlying limestone bedrock. They are moderately permeable in the subsoil, moderately slowly permeable in the underlying till, and very slowly permeable or impermeable in the limestone bedrock. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, superactive, mesic Typic Argiaquolls.

Typical Pedon for the Series

Navunon loam (fig. 20), on a concave slope of less than 1 percent, in a cultivated field in Pulaski County, Indiana, about 1 mile west and 4 miles south of Francesville; 700 feet south and 150 feet west of the northeast corner of sec. 31, T. 29 N., R. 4 W.; USGS Francesville topographical quadrangle; latitude 40 degrees 55 minutes 28.07 seconds north and longitude 86 degrees 54 minutes 41.83 seconds west; NAD 1927:

Ap—0 to 9 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; common very fine and fine roots throughout; slightly acid; abrupt smooth boundary.
Btg1—9 to 13 inches; very dark gray (10YR 3/1) sandy clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; common very fine roots throughout; common faint very dark gray (10YR 3/1) clay films on faces of

peds; many medium distinct dark grayish brown (10YR 4/2) iron oxide depletions in the matrix; 1 percent rock fragments; neutral; clear wavy boundary.

Btg2—13 to 20 inches; grayish brown (10YR 5/2) loam; moderate medium subangular blocky structure; friable; common very fine and fine roots throughout; common fine moderate-continuity interstitial and tubular pores; many faint dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium faint brown (10YR 5/3) iron oxide depletions in the matrix; 2 percent rock fragments; neutral; clear wavy boundary.

Btg3—20 to 24 inches; grayish brown (10YR 5/2) loam; moderate medium subangular blocky structure; friable; common very fine and fine roots between peds; few faint dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; common medium prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; 5 percent rock fragments; neutral; clear wavy boundary.

Cg1—24 to 31 inches; grayish brown (10YR 5/2) fine sandy loam; weak very coarse prismatic structure; friable; many medium prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; 9 percent rock fragments; strongly effervescent throughout; slightly alkaline; clear wavy boundary.

Cg2—31 to 43 inches; grayish brown (10YR 5/2) fine sandy loam; weak very coarse prismatic structure; friable; many medium prominent yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium faint gray (10YR 6/1) iron oxide depletions in the matrix; 12 percent rock fragments; strongly effervescent throughout; slightly alkaline; abrupt smooth boundary.

2R—43 inches; white (10YR 8/1), unweathered limestone bedrock; indurated; strongly effervescent throughout; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 22 to 40 inches. The depth to free carbonates ranges from 22 to 46 inches. The depth to the top of the bedrock is commonly 40 to 60 inches but ranges from 40 to 80 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The A horizon and the AB horizon, if it occurs, have hue of 10YR, value of 2 or 3, and chroma of 1 or 2. They are loam, silt loam, sandy loam, fine sandy loam, or clay loam. The content of rock fragments ranges from 0 to 5 percent. Reaction ranges from moderately acid to neutral.

The Btg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Value of 3 occurs in the horizon immediately below the A horizon in some pedons. The Btg horizon is loam, clay loam, or sandy clay loam. The content of rock fragments ranges from 1 to 10 percent. Reaction ranges from moderately acid to neutral.

Some pedons have a BC horizon. This horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 4. It is sandy loam, loam, or fine sandy loam. The content of rock fragments ranges from 1 to 10 percent. Reaction ranges from slightly acid to slightly alkaline.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 4. It is sandy loam or loam. The content of rock fragments ranges from 1 to 14 percent. Reaction is slightly alkaline or moderately alkaline. The horizon has free calcium carbonates.

The R layer has hue of 10YR, value of 7 or 8, and chroma of 1 or 2. It is very strongly cemented or indurated.

Newton Series

The Newton series consists of very deep, very poorly drained soils on outwash plains and lake plains. These soils formed in sandy sediments. Permeability is rapid. Slopes are 0 to 1 percent.

These soils are classified as sandy, mixed, mesic Typic Humaquepts.

Typical Pedon for the Series

Newton loamy fine sand, on a slope of less than 1 percent, in an idle field at an elevation of 713 feet, in Jasper County, Indiana; 700 feet west and 150 feet south of the northeast corner of sec. 2, T. 31 N., R. 5 W.; USGS San Pierre topographic quadrangle; latitude 41 degrees 10 minutes 18.99 seconds north and longitude 86 degrees 57 minutes 6.19 seconds west; NAD 1927:

A1—0 to 6 inches; very dark gray (10YR 3/1) loamy fine sand, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many fine and very fine roots; few streaks of light gray (10YR 7/2) uncoated sand grains; very strongly acid; clear smooth boundary.

A2—6 to 10 inches; very dark gray (10YR 3/1) loamy fine sand, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; many fine and very fine roots; common streaks of light gray (10YR 7/2) uncoated sand grains; very strongly acid; clear smooth boundary.

Bg—10 to 15 inches; light brownish gray (10YR 6/2) loamy fine sand; weak coarse subangular blocky structure; very friable; common fine and very fine roots; few fine distinct dark gray (10YR 4/1) iron oxide depletions in the matrix; many very dark gray (10YR 3/1) organic streaks; very strongly acid; clear smooth boundary.

Cg1—15 to 25 inches; light brownish gray (10YR 6/2) fine sand; single grain; loose; few very fine roots; very strongly acid; clear smooth boundary.

Cg2—25 to 62 inches; light brownish gray (2.5Y 6/2) fine sand; single grain; loose; strongly acid; clear smooth boundary.

Cg3—62 to 80 inches; light brownish gray (2.5Y 6/2) fine sand; single grain; loose; moderately acid.

Range in Characteristics

The depth to the C horizon ranges from 10 to 40 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral in hue and has value of 2.5. It is mucky fine sand, loamy fine sand, loamy sand, sand, or fine sandy loam. Reaction ranges from moderately acid to very strongly acid.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or less. It is fine sand, sand, loamy sand, or loamy fine sand. Thin strata of sandy loam are in some pedons. Reaction is strongly acid or very strongly acid.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or less. It is fine sand or sand. Thin strata of sandy loam are in some pedons. Reaction is dominantly strongly acid or very strongly acid but ranges to moderately acid below a depth of 40 inches.

NofA—Newton-Morocco loamy fine sands, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions and swells

Average Composition of Components

Newton and similar soils: 45 percent
Morocco and similar soils: 35 percent
Maumee and similar soils: 10 percent
Brems and similar soils: 5 percent
Gilford and similar soils: 5 percent

Properties and Qualities of the Newton Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 4.1 inches to a depth of 60 inches

Properties and Qualities of the Morocco Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 5.0 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Oakville Series

The Oakville series consists of very deep, excessively drained soils on dunes and beach ridges on outwash plains, lake plains, and moraines. These soils formed in sandy eolian deposits. Permeability is rapid. Slopes range from 0 to 18 percent.

These soils are classified as mixed, mesic Typic Udipsamments.

Typical Pedon for the Series

Oakville fine sand, on a wooded backslope in an area where the slope is 7 percent, at an elevation of 715 feet, in Jasper County, Indiana, about 4 miles south of the Kankakee River (Dunns Bridge) in the Jasper-Pulaski State Game Preserve; 1,720 feet south and 1,820 feet east of the northwest corner of sec. 10, T. 32 N., R. 5 E.; USGS San Pierre topographic quadrangle; latitude 41 degrees 9 minutes 11 seconds north and longitude 86 degrees 58 minutes 57 seconds west; NAD 1927:

A—0 to 3 inches; very dark brown (10YR 2/2) fine sand, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many fine and very fine and few medium and coarse roots throughout; very strongly acid; clear wavy boundary.

BE—3 to 6 inches; dark yellowish brown (10YR 4/4) fine sand; weak fine and medium subangular blocky structure; very friable; many fine and very fine and common medium and coarse roots throughout; very strongly acid; clear wavy boundary.

Bw1—6 to 15 inches; strong brown (7.5YR 5/6) fine sand; weak medium subangular blocky structure; very friable; common fine and very fine and common medium and coarse roots throughout; strongly acid; gradual wavy boundary.

Bw2—15 to 27 inches; strong brown (7.5YR 5/8) fine sand; weak medium and coarse subangular blocky structure; very friable; common fine and very fine and many medium and coarse roots throughout; very strongly acid; clear wavy boundary.

Bw3—27 to 42 inches; brownish yellow (10YR 6/6) fine sand; weak medium and coarse subangular blocky structure; very friable; common fine and very fine and many medium and coarse roots throughout; strongly acid; clear irregular boundary.

BC—42 to 59 inches; light yellowish brown (10YR 6/4) fine sand; weak medium and coarse subangular blocky structure; very friable; common fine and very fine and many medium and coarse roots throughout; strongly acid; clear wavy boundary.

C—59 to 80 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; common fine and very fine and many medium and coarse roots throughout; strongly acid.

Range in Characteristics

The depth to the base of soil development ranges from 18 to 65 inches. The particle-size control section ranges from 50 to 90 percent fine sand and from 0 to 25 percent very fine sand. It has a combined silt and clay fraction of less than 10 percent. These soils have a regular decrease in organic matter content with increasing depth.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Pedons in cultivated areas have an Ap horizon. This horizon has hue of 10YR, value of 3 or 4 (6 or more when dry), and chroma of 1 to 4. The A horizon is fine sand, sand, loamy fine sand, or loamy sand. Reaction ranges from very strongly acid to neutral.

The BE horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. It is fine sand, sand, loamy fine sand, or loamy sand. Reaction ranges from moderately acid to neutral.

Some pedons have a thin E horizon.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is fine sand or loamy fine sand. Reaction ranges from very strongly acid to neutral.

The BC horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Reaction ranges from very strongly acid to neutral.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 to 6. It is fine sand, loamy fine sand, sand, or loamy sand. Reaction ranges from very strongly acid to neutral.

OacA—Oakville-Denham fine sands, 0 to 1 percent slopes

Setting

Landform: Dunes on till plains and outwash plains
Position on the landform: Swells

Average Composition of Components

Oakville and similar soils: 50 percent
Denham and similar soils: 40 percent
Brems and similar soils: 10 percent

Properties and Qualities of the Oakville Soil

Parent material: Eolian sands
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Properties and Qualities of the Denham Soil

Parent material: Eolian sands
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

OacB—Oakville-Denham fine sands, 1 to 5 percent slopes

Setting

Landform: Dunes on till plains and outwash plains
Position on the landform: Swells, footslopes, and backslopes

Average Composition of Components

Oakville and similar soils: 45 percent
Denham and similar soils: 40 percent
Chelsea and similar soils: 10 percent
Brems and similar soils: 5 percent

Properties and Qualities of the Oakville Soil

Parent material: Eolian sands
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Properties and Qualities of the Denham Soil

Parent material: Eolian sands
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

OaeC—Oakville fine sand, 5 to 12 percent slopes

Setting

Landform: Dunes on lake plains, till plains, and outwash plains
Position on the landform: Knolls, backslopes, shoulders, and summits

Average Composition of Components

Oakville and similar soils: 80 percent
Chelsea and similar soils: 10 percent
Denham and similar soils: 10 percent

Properties and Qualities of the Oakville Soil

Parent material: Eolian sands
Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

OaeD—Oakville fine sand, 12 to 18 percent slopes

Setting

Landform: Dunes on lake plains, till plains, and outwash plains
Position on the landform: Knolls, backslopes, shoulders, and summits

Average Composition of Components

Oakville and similar soils: 80 percent
Chelsea and similar soils: 10 percent
Denham and similar soils: 10 percent

Properties and Qualities of the Oakville Soil

Parent material: Eolian sands
Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Available water capacity: About 4.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Odell Series

The Odell series (fig. 21) consists of somewhat poorly drained soils that are moderately deep to dense till. These soils formed in as much as 18 inches of silty material and the underlying loamy glacial till. They are in swells on moraines and till plains. Permeability is moderate in the subsoil and slow in the underlying material. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, superactive, mesic Aquic Argiudolls.

Typical Pedon for the Series

Odell silt loam, in a nearly level area, in a cultivated field at an elevation of 782 feet, in Benton County, Indiana; 160 feet south and 1,440 feet east of the northwest corner of sec. 11, T. 24 N., R. 9 W.; USGS Boswell topographic quadrangle; latitude 40 degrees 32 minutes 56 seconds north and longitude 87 degrees 24 minutes 37.69 seconds west; NAD 1927:

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to weak medium granular; friable; common very fine and fine roots; 2 percent fine pebbles; strongly acid; abrupt smooth boundary.

2Bt1—11 to 14 inches; very dark grayish brown (10YR 3/2) clay loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; firm; common fine roots throughout; few faint very dark gray (10YR 3/1) organo-clay films on faces of peds; common medium faint grayish brown (10YR 5/2) iron oxide depletions; 10 percent pebbles and cobbles; moderately acid; clear wavy boundary.

2Bt2—14 to 20 inches; brown (10YR 4/3) clay loam; moderate fine and medium subangular blocky structure; firm; common fine roots between peds; distinct dark gray (10YR 4/1) clay films on faces of peds and common distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; many medium faint dark grayish brown (10YR 4/2) iron oxide depletions; 3 percent pebbles and cobbles; slightly acid; clear wavy boundary.

2Bt3—20 to 26 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; firm; common fine roots between peds; many distinct dark gray (10YR 4/1) clay films on faces of peds and common distinct very dark gray (10YR 3/1) organo-clay films on faces of peds; common fine distinct gray (10YR 5/1) iron oxide depletions; 13 percent pebbles and cobbles; slightly acid; clear wavy boundary.

2Bt4—26 to 31 inches; yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; firm; common fine roots between peds; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium distinct yellowish brown (10YR 5/6) masses of iron accumulation and common medium distinct grayish brown (10YR 5/2) iron oxide depletions; 6 percent pebbles and cobbles; neutral; clear wavy boundary.

2Cd1—31 to 52 inches; yellowish brown (10YR 5/4) loam; weak very coarse prismatic structure; firm; few fine roots between peds; few fine moderate-continuity tubular pores; few light gray (10YR 7/1) carbonate accumulations throughout; many medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix and many coarse distinct grayish brown (2.5Y 5/2) iron oxide depletions on faces of peds; 5 percent pebbles and cobbles; strongly effervescent; slightly alkaline; clear wavy boundary.

2Cd2—52 to 80 inches; yellowish brown (10YR 5/4) loam; weak very coarse prismatic structure; firm; few fine moderate-continuity tubular pores; common coarse distinct grayish brown (2.5Y 5/2) iron oxide depletions in the matrix and many coarse prominent gray (2.5Y 5/1) iron oxide depletions on faces of peds; 6 percent pebbles and cobbles; strongly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 24 to 40 inches. The content of clay in the particle-size control section (weighted average) ranges from 18 to 35 percent.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is commonly loam or silt loam, but the range includes fine sandy loam and silty clay loam. Reaction ranges from neutral to strongly acid.

The BA or 2BA horizon, if it occurs, has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is loam, silt loam, or silty clay loam. Reaction ranges from neutral to moderately acid.

The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. Value of 3 and chroma of 2 occur in the horizon immediately below the surface layer in some pedons. The 2Bt horizon is dominantly loam or clay loam, but the range includes silty clay loam where the silt cap is at the maximum thickness. The content of pebbles and cobbles ranges from 0 to

14 percent. Reaction ranges from moderately acid to neutral.

The 2Cd horizon has hue of 10YR, 7.5YR, or 2.5Y, value of 4 to 7, and chroma of 2 to 4. It is loam or fine sandy loam. It averages 10 to 20 percent clay and 30 to 60 percent sand. The content of pebbles and cobbles ranges from 0 to 14 percent. Reaction is slightly alkaline or moderately alkaline. The horizon contains free carbonates.

OeaA—Odell fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Odell and similar soils: 90 percent
Corwin and similar soils: 5 percent
Darroch and similar soils: 5 percent

Properties and Qualities of the Odell Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

OecA—Odell-Francesville fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Odell and similar soils: 45 percent
Francesville and similar soils: 40 percent
Brookston and similar soils: 5 percent
Darroch and similar soils: 5 percent
Navunon and similar soils: 5 percent

Properties and Qualities of the Odell Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Properties and Qualities of the Francesville Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to dense material; 40 to 80 inches to bedrock (lithic)
Drainage class: Somewhat poorly drained
Available water capacity: About 4.3 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Ormas Series

The Ormas series consists of very deep, well drained soils on high terraces or uplands in areas where the surface is plane or convex. These soils formed in wind-reworked sandy outwash. Permeability is rapid in the sandy material, moderately rapid in the loamy material, and very rapid in the underlying gravelly sand. Slopes range from 0 to 5 percent.

These soils are classified as loamy, mixed, active, mesic Arenic Hapludalfs.

Typical Pedon for the Series

Ormas loamy sand, on a slope of less than 1 percent, in a cultivated field at an elevation of 795 feet, in Wabash County, Indiana; 1,320 feet north and 2,750 feet east of the southwest corner of sec. 26, T. 30 N., R. 7 E.; USGS South Whitley West topographic quadrangle; latitude 41 degrees 1 minute 9.12 seconds north and longitude 85 degrees 42 minutes 42.55 seconds west; NAD 1927:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) loamy sand, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

E—10 to 18 inches; yellowish brown (10YR 5/4) loamy sand; moderate fine granular structure; very friable; common fine roots; 1 percent rock fragments (gravel); neutral; clear wavy boundary.

Bw—18 to 23 inches; dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; common fine roots; very few faint dark yellowish brown (10YR 4/4) clay films on faces of peds and on surfaces of pebbles; 3 percent rock fragments (gravel); neutral; clear wavy boundary.

Bt1—23 to 32 inches; dark yellowish brown (10YR 4/4) loamy sand; moderate medium subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds and on surfaces of pebbles; 5 percent rock fragments (gravel); slightly acid; clear wavy boundary.

2Bt2—32 to 44 inches; dark yellowish brown (10YR 4/4) gravelly sandy clay loam; moderate medium subangular blocky structure; firm; few fine roots; many faint brown (7.5YR 4/4) clay films on faces of peds and on surfaces of pebbles; 15 percent rock fragments (gravel); slightly acid; clear wavy boundary.

2Bt3—44 to 50 inches; dark yellowish brown (10YR 4/4) gravelly loamy sand; moderate fine subangular blocky structure; very friable; few fine roots; few faint brown (7.5YR 4/4) clay bridges between sand grains; 15 percent gravel; slightly acid; abrupt irregular boundary.

2C1—50 to 62 inches; pale brown (10YR 6/3) gravelly sand; single grain; loose; 20 percent gravel; strongly effervescent; moderately alkaline; clear wavy boundary.

2C2—62 to 80 inches; brown (10YR 5/3) gravelly coarse sand; single grain; loose; 20 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to calcareous sand and gravel ranges from 45 to 75 inches. The content of clay averages between 10 and 25 percent in the argillic horizon. A sandy substratum phase is recognized.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is loamy sand, loamy fine sand, or sand. Reaction ranges from neutral to moderately acid.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is loamy sand, loamy fine sand, or sand. The content of gravel ranges from 0 to 5 percent. Reaction ranges from neutral to moderately acid.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. It is loamy sand, loamy fine sand, or sand. The content of gravel ranges from 0 to 5 percent. Reaction ranges from neutral to moderately acid.

The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 3 to 8. It is coarse sandy loam, loam, loamy sand, or sandy clay loam. The content of gravel ranges from 0 to 10 percent. Reaction ranges from slightly acid to strongly acid.

The 2Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 3 to 8. It is gravelly coarse sandy loam, gravelly loam, gravelly loamy sand, or gravelly sandy clay loam. The content of gravel ranges from 15 to 30 percent. Reaction ranges from slightly acid to strongly acid above a depth of 40 inches and from moderately acid to slightly alkaline below this depth.

The 2C horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or 3. It is gravelly coarse sand, gravelly sand, gravelly loamy sand, or very gravelly coarse sand. The content of gravel ranges from 15 to 30 percent. Reaction is slightly alkaline or moderately alkaline.

Pmg—Pits, gravel

This map unit is on till plains and outwash plains in areas from which gravel has been removed.

Generally, areas of this unit consist of mixed loamy and sandy soil materials. Included in mapping are some areas from which sand and gravel have been removed and where spoil material has been piled.

Onsite investigation is needed to determine site characteristics and interpretive information.

Pps—Pits, quarries, limestone

This map unit is on till plains and outwash plains in areas from which limestone has been removed.

Generally, areas of this unit consist of mixed loamy soil materials. Included in mapping are areas that have been filled with water and areas where spoil material has been piled.

Onsite investigation is needed to determine site characteristics and interpretive information.

Radioville Series

The Radioville series consists of very deep, poorly drained and very poorly drained soils on lake plains and outwash plains. These soils formed in loamy sediments overlying silty or clayey lacustrine sediments. Permeability is moderate. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, superactive, mesic Typic Argiaquolls.

Typical Pedon for the Series

Radioville loam, on a flat slope of less than 1 percent, in a cultivated field at an elevation of 686 feet, in Pulaski County, Indiana, 1 mile south and 1/2 mile west of Medaryville; 1,775 feet south and 2,050 feet east of the northwest corner of sec. 8, T. 30 N., R. 4 W.; USGS Medaryville topographic quadrangle; latitude 41 degrees 3 minutes 57.6 seconds north and longitude 86 degrees 54 minutes 11.8 seconds west; NAD 1927:

Ap1—0 to 7 inches; black (10YR 2/1) loam, very dark grayish brown (10YR 3/2) dry; moderate fine granular structure; friable; few very fine and fine roots throughout; few very fine and common medium high-continuity tubular pores throughout; slightly acid; abrupt smooth boundary.

Ap2—7 to 11 inches; black (10YR 2/1) loam, very dark grayish brown (10YR 3/2) dry; moderate fine subangular blocky structure; friable; few very fine and fine roots throughout; few very fine and common medium high-continuity tubular pores throughout; slightly acid; abrupt smooth boundary.

AB—11 to 18 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; friable; few very fine and fine roots throughout; few very fine and common medium high-continuity tubular pores throughout; common fine distinct dark grayish brown (10YR 4/2) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Btg1—18 to 23 inches; dark gray (10YR 4/1) loam; moderate medium subangular blocky structure; friable; few very fine and common medium high-continuity tubular pores throughout; very dark gray (10YR 3/1) organo-clay films on faces of peds and in pores; common medium faint brown (10YR 4/3) and common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Btg2—23 to 30 inches; grayish brown (10YR 5/2) loam; moderate medium prismatic structure; friable; few very fine and common medium high-continuity tubular pores throughout; very dark gray (10YR 3/1) organo-clay films on faces of peds and in pores; common distinct continuous dark gray (10YR 4/1) clay films on faces of peds and in pores; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Btg3—30 to 36 inches; gray (2.5Y 5/1) loam; moderate medium prismatic structure; friable; few medium high-continuity tubular pores; very dark gray (10YR 3/1) organo-clay films on faces of peds and in pores; common distinct continuous dark gray (10YR 4/1) clay films on faces of peds and in pores; common medium distinct brownish yellow (10YR 6/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Btg4—36 to 42 inches; gray (2.5Y 5/1) loam; weak coarse prismatic structure; friable; very dark gray (10YR 3/1) organo-clay films on faces of peds and in pores; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

2C—42 to 53 inches; pale brown (10YR 6/3) fine sand; single grain; loose; strongly effervescent; moderately alkaline; abrupt smooth boundary.

3Cg1—53 to 62 inches; dark grayish brown (10YR 4/2) silty clay loam; massive; friable; common thin faint gray (10YR 6/1) sand lenses between bedding planes; common medium prominent red (2.5YR 5/6) and common medium faint brown (10YR 5/3) masses of iron oxide accumulation in the matrix; strongly effervescent; moderately alkaline; clear smooth boundary.

3Cg2—62 to 80 inches; dark gray (10YR 4/1) silty clay loam; massive; friable; common thin faint gray (10YR 6/1) fine sand lenses between bedding planes; common medium faint grayish brown (10YR 5/2) masses of iron oxide accumulation in the matrix; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon is 30 to 55 inches and generally coincides with the depth to carbonates. The thickness of loamy sediments over silty or clayey lacustrine materials ranges from 40 to 60 inches. Most pedons have some strata of fine sand or sand near the contact with the lacustrine materials. The content of clay in the particle-size control section ranges from 20 to 35 percent.

The Ap and AB horizons have hue of 10YR, value of 2 or 3, and chroma of 1 or 2. They are silt loam, loam, fine sandy loam, silty clay loam, or clay loam. The content of rock fragments (pebbles) ranges from 0 to 5 percent by volume. Reaction is slightly acid or neutral.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. Some subhorizons have chroma of 3 or 4 in the lower part of the argillic horizon. The texture is clay loam, loam, very fine sandy loam, or silty clay loam in the upper part and loam, sandy clay loam, clay loam, silt loam, or sandy loam in the lower part. The average content of fine sand or coarser sand ranges from 25 to 40 percent. The content of rock fragments (pebbles) ranges from 0 to 5 percent by volume. Reaction is slightly acid or neutral.

Some pedons have a BC horizon. This horizon is less than 10 inches thick. It has colors similar to those of the Btg horizon. The texture is loam, very fine sandy loam, sandy loam, or silt loam with thin strata of sand or fine sand. The content of rock fragments (pebbles) ranges from 0 to 5 percent by volume. Reaction is neutral or slightly alkaline.

The 2C or 2Cg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. It is fine sand or sand. The content of rock fragments (pebbles) ranges from 0 to 5 percent by volume. Reaction is slightly alkaline or moderately alkaline.

The 3C or 3Cg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. It is silt loam, silty clay loam, or silty clay. It has very thin strata of sand or fine sand between the bedding planes in some pedons. The content of clay ranges from 25 to 55 percent. The calcium carbonate equivalent ranges from 5 to 30 percent. Reaction is slightly alkaline or moderately alkaline.

RebA—Radioville-Mermill loams, 0 to 1 percent slopes

Setting

Landform: Lake plains
Position on the landform: Depressions

Average Composition of Components

Radioville and similar soils: 45 percent
Mermill and similar soils: 40 percent
Conover and similar soils: 5 percent
Rensselaer and similar soils: 5 percent
Strole and similar soils: 5 percent

Properties and Qualities of the Radioville Soil

Parent material: Fine-loamy outwash over clayey lacustrine deposits
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 10.4 inches to a depth of 60 inches

Properties and Qualities of the Mermill Soil

Parent material: Fine-loamy outwash over fine-loamy till
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 9.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Rensselaer Series

The Rensselaer series consists of very deep, poorly drained and very poorly drained soils on till plains, stream terraces, outwash terraces, and outwash plains. These soils formed in loamy sediments. Permeability is moderate. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, superactive, mesic Typic Argiaquolls.

Typical Pedon for the Series

Rensselaer loam, on a concave slope of less than 1 percent, in a cultivated field in Marshall County, Indiana, 3 miles east and 1.5 miles north of Bourbon; 1,150 feet east and 380 feet north of the southwest corner of sec. 9, T. 33 N., R. 4 E.; USGS Bourbon topographic quadrangle; latitude 41 degrees 19 minutes 7.5 seconds north and longitude 86 degrees 4 minutes 23.2 seconds west; NAD 1927:

Ap—0 to 11 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; common fine roots throughout; neutral; clear smooth boundary.

A—11 to 15 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable;

common fine roots throughout; common fine distinct brown (10YR 4/3) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

Btg1—15 to 26 inches; dark gray (10YR 4/1) clay loam; moderate medium subangular blocky structure; firm; few fine roots between peds; many distinct discontinuous very dark gray (10YR 3/1) organo-clay films on faces of peds; few fine prominent yellowish red (5YR 5/8) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary.

Btg2—26 to 38 inches; gray (10YR 6/1) clay loam; moderate medium subangular blocky structure; firm; few fine roots between peds; many distinct discontinuous dark gray (10YR 4/1) clay films on faces of peds; common medium prominent yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; neutral; clear wavy boundary.

Btg3—38 to 42 inches; gray (10YR 5/1) loam; moderate medium subangular blocky structure; friable; few fine and very fine roots between peds; common distinct patchy dark gray (10YR 4/1) clay films on faces of peds; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; slightly effervescent; slightly alkaline; clear wavy boundary.

2Cg1—42 to 60 inches; gray (10YR 6/1) silt loam with thin strata of fine sand; massive; friable; few medium prominent brownish yellow (10YR 6/8) masses of iron accumulation in the matrix; 10 percent fine pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

2Cg2—60 to 76 inches; grayish brown (10YR 5/2) fine sand; single grain; loose; thin strata of loamy sand and sandy loam; massive; friable; common medium distinct yellowish brown (10YR 5/4) masses of iron accumulation in the matrix; 5 percent fine pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

3Cg3—76 to 80 inches; gray (10YR 5/1) loam; massive; friable; 5 percent fine pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 40 to 60 inches. The content of clay in the particle-size control section ranges from 20 to 35 percent.

The A horizons have hue of 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 2. They are silt loam, loam, sandy loam, fine sandy loam, mucky loam, silty clay loam, mucky silty clay loam, or clay loam. The content of rock fragments (pebbles) ranges from 0 to 5 percent. Reaction is slightly acid or neutral.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. Some subhorizons have chroma of 3 or 4 in the lower part of the argillic horizon. The Btg horizon is clay loam, loam, or silty clay loam in the upper part and loam, sandy clay loam, clay loam, silt loam, or sandy loam in the lower part. The average content of fine sand or coarser sand ranges from 25 to 35 percent. The content of rock fragments (pebbles) ranges from 0 to 5 percent. Reaction is slightly acid or neutral in the upper part and neutral or slightly alkaline in the lower part. The calcium carbonate equivalent ranges from 0 to 10 percent.

The 2Cg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is stratified and includes textures of fine sand, very fine sand, loamy sand, loamy fine sand, sandy loam, loam, and silt loam. Strata of fine sand are in all pedons, and strata of coarse sand or sand (3 to 6 inches thick) are in some pedons. The average content of clay ranges from 2 to 20 percent. The content of rock fragments ranges from 0 to 10 percent. The fragments are dominantly fine and medium pebbles. The calcium carbonate equivalent ranges from 5 to 25 percent. Reaction is slightly alkaline or moderately alkaline.

The 3Cg horizon, if it occurs, has hue of 10YR or 2.5YR or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is loam or fine sandy loam. The content of rock fragments ranges from 1 to 10 percent. The content of clay ranges from 10 to 20 percent. Reaction is slightly alkaline or moderately alkaline.

RevA—Rensselaer-Radioville loams, 0 to 1 percent slopes

Setting

Landform: Lake plains and outwash plains
Position on the landform: Depressions

Average Composition of Components

Rensselaer and similar soils: 45 percent
Radioville and similar soils: 35 percent
Medaryville and similar soils: 10 percent
Gilford and similar soils: 5 percent
Granby and similar soils: 5 percent

Properties and Qualities of the Rensselaer Soil

Parent material: Fine-loamy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 10.4 inches to a depth of 60 inches

Properties and Qualities of the Radioville Soil

Parent material: Fine-loamy outwash over clayey lacustrine deposits
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 10.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

ReyA—Rensselaer loam, 0 to 1 percent slopes

Setting

Landform: Till plains and outwash plains
Position on the landform: Depressions

Average Composition of Components

Rensselaer and similar soils: 75 percent
Brookston and similar soils: 10 percent
Goodell and similar soils: 10 percent
Whitaker and similar soils: 5 percent

Properties and Qualities of the Rensselaer Soil

Parent material: Fine-loamy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 10.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Riddles Series

The Riddles series consists of very deep, well drained soils on moraines of Wisconsinan age. These soils formed in loamy and sandy till. Permeability is moderate. Slopes range from 0 to 2 percent.

These soils are classified as fine-loamy, mixed, active, mesic Typic Hapludalfs.

Typical Pedon for the Series

Riddles fine sandy loam, on a convex slope of 4 percent, in a cultivated field at an elevation of 902 feet, in Elkhart County, Indiana, approximately 1 mile northeast of the community of Southwest, on the south side of Indiana Highway 119; 2,250 feet south and 500 feet east of the northwest corner of sec. 26, T. 36 N., R. 5 E.; USGS Foraker topographic quadrangle; latitude 41 degrees 32 minutes 39 seconds north and longitude 85 degrees 55 minutes 23 seconds west; NAD 1927:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine and medium roots throughout; many very fine to medium interstitial and tubular pores; 7 percent gravel; slightly acid; abrupt wavy boundary.

Bt1—8 to 13 inches; brown (7.5YR 4/3) sandy clay loam; moderate fine and medium subangular blocky structure; firm; few fine and medium roots throughout; many fine interstitial and tubular pores; many faint patchy brown (10YR 4/3) clay films on faces of peds; common distinct brown (10YR 5/3) silt coats on faces of peds; 8 percent gravel; neutral; clear wavy boundary.

Bt2—13 to 20 inches; brown (10YR 4/3) clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine and medium roots throughout; many fine interstitial and tubular pores; many faint continuous dark grayish brown (10YR 4/2) clay films on faces of peds; common faint brown (10YR

5/3) silt coats on faces of peds; 3 percent gravel; slightly acid; clear wavy boundary.

Bt3—20 to 33 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few fine and medium roots throughout; many fine interstitial and tubular pores; many faint continuous brown (10YR 4/3) clay films on faces of peds; many faint brown (10YR 5/3) silt coats on faces of peds; common medium faint yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; 7 percent gravel; moderately acid; gradual wavy boundary.

Bt4—33 to 46 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate coarse subangular blocky structure; firm; few fine roots throughout; many fine interstitial and tubular pores; many faint continuous brown (10YR 4/3) clay films on faces of peds; few fine faint yellowish brown (10YR 5/8) and few fine distinct brown (10YR 5/3) masses of iron oxide accumulation in the matrix; 7 percent gravel; neutral; gradual wavy boundary.

Bt5—46 to 55 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak coarse subangular blocky structure; firm; few very fine roots throughout; many fine interstitial and tubular pores; many faint patchy brown (10YR 4/3) clay films on faces of peds; few fine faint yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; few fine distinct brown (10YR 5/3) iron oxide depletions in the matrix; 7 percent gravel; 1 percent cobbles; moderately acid; gradual wavy boundary.

Bt6—55 to 63 inches; dark yellowish brown (10YR 4/4) sandy loam; weak coarse subangular blocky structure; firm; few very fine roots throughout; many fine interstitial and tubular pores; many faint patchy brown (10YR 4/3) clay films on faces of peds; 5 percent gravel; moderately acid; clear wavy boundary.

2Bt&E—63 to 70 inches; brown (10YR 4/3) sandy loam (Bt) occurring as lamellae 1 to 1.25 inches thick with a combined thickness of 4 inches; weak thick platy structure; very friable; few very fine roots throughout; few very fine interstitial and tubular pores; common distinct continuous brown (10YR 4/3) clay bridges between sand grains; 5 percent gravel; moderately acid; yellowish brown (10YR 5/4) sand (E); weak medium subangular blocky structure; very friable; few very fine roots throughout; few very fine interstitial and tubular pores; 5 percent gravel; moderately acid; gradual wavy boundary.

2E&Bt—70 to 78 inches; yellowish brown (10YR 5/4) loamy sand (E); weak medium subangular blocky structure; very friable; few very fine roots throughout; few very fine interstitial and tubular pores; 5 percent gravel; slightly acid; brown (10YR 4/3) loamy sand (Bt) occurring as lamellae 1 to 1.5 inches thick with a combined thickness of 2 inches; weak thick platy structure; very friable; common distinct continuous brown (10YR 4/3) clay bridges between sand grains; few very fine roots throughout; few very fine interstitial and tubular pores; 5 percent gravel; slightly acid; clear wavy boundary.

2B&BC—78 to 90 inches; 85 percent dark yellowish brown (10YR 4/4) loamy sand (B); weak thin platy structure; very friable; few very fine interstitial and tubular pores; 3 percent gravel; slightly acid; 15 percent light yellowish brown (10YR 6/4) sand (BC); single grain; loose; few very fine interstitial and tubular pores; 3 percent gravel; slightly acid; clear wavy boundary.

3C—90 to 100 inches; yellowish brown (10YR 5/4) fine sandy loam with pockets of sand; weak thin platy structure; firm; 5 percent gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon and the depth to carbonates range from 40 to more than 80 inches. The particle-size control section averages 20 to 30 percent clay and more than 40 percent sand.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. Dry value is 6 or more. The texture is loam, silt loam, sandy loam, fine sandy loam, sandy clay loam, or clay loam. The content of rock fragments ranges from 1 to 14 percent. Reaction ranges from moderately acid to neutral. Some pedons have an E or EB horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is loam, silt loam, sandy loam, or fine sandy loam.

The Bt or BE horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The texture is sandy clay loam, clay loam, or loam. In the lower part of the Bt horizon, the range includes fine sandy loam and sandy loam. The content of rock fragments in the Bt or BE horizon ranges from 1 to 14 percent. Reaction ranges from strongly acid to neutral.

Some pedons have a BC horizon. This horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is loam, sandy clay loam, clay loam, or sandy loam. Reaction is neutral or slightly alkaline.

The 2Bt, 2Bt&E, 2E&Bt, or 2B&BC horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is fine sandy loam, sandy loam, loamy sand, or sand or the gravelly analogs of these textures. The sand fraction of individual strata or subhorizons is well graded. The content of rock fragments averages less than 15 percent, but in individual horizons it can range to 30 percent. Reaction ranges from strongly acid to neutral.

Some pedons have a C horizon. This horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is loam or sandy loam. The content of gravel ranges from 7 to 14 percent. Reaction is slightly alkaline or moderately alkaline. The horizon contains free carbonates in most pedons.

Some pedons have a 2C horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is sandy loam, loamy sand, or sand or the gravelly analogs of these textures. The sand fraction of individual strata or subhorizons is well graded. The content of rock fragments averages less than 15 percent, but in individual horizons it can range to 34 percent. Reaction is slightly alkaline or moderately alkaline.

The 3C horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is loam, sandy loam, or fine sandy loam. It has pockets of sand in some pedons. The content of gravel ranges from 1 to 10 percent. Reaction is slightly alkaline or moderately alkaline. The horizon contains free carbonates. The calcium carbonate equivalent ranges from 10 to 35 percent.

RhcA—Riddles fine sandy loam, 0 to 2 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Riddles and similar soils: 70 percent
Miami and similar soils: 15 percent
Crosier and similar soils: 5 percent
Metea and similar soils: 5 percent
Williamstown and similar soils: 5 percent

Properties and Qualities of the Riddles Soil

Parent material: Till
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Available water capacity: About 9.8 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Sebewa Series

The Sebewa series consists of very deep, poorly drained and very poorly drained soils on outwash plains, valley trains, and stream terraces in terrace landscapes. These soils formed in loamy outwash and the underlying gravelly sand or sand outwash. Permeability is moderate in the upper loamy materials and rapid or very rapid in the underlying sandy materials. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Argiaquolls.

Typical Pedon for the Series

Sebewa loam, on a slope of 1 percent, in a cultivated field at an elevation of 855 feet, in Eaton County, Michigan, about 3 miles east of the town of Charlotte; 100 feet south and 700 feet west of the northeast corner of sec. 9, T. 2 N., R. 5 W.; USGS Chester topographic quadrangle; latitude 42 degrees 34 minutes 56.56 seconds north and longitude 84 degrees 53 minutes 51.48 seconds west; NAD 1927:

Ap—0 to 11 inches; very dark brown (10YR 3/3) loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

Bg—11 to 14 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable; very dark grayish brown (10YR 3/2) fillings in root channels; few fine faint gray (10YR 5/1) iron depletions; neutral; clear wavy boundary.

Btg1—14 to 19 inches; gray (10YR 5/1) sandy clay loam; moderate medium subangular blocky structure; firm; few distinct dark gray (10YR 4/1) clay films on faces of peds; few fine roots; common medium distinct yellowish brown (10YR 5/6) and few medium prominent olive brown (2.5Y 4/4) masses of iron oxide accumulation in the matrix; slightly alkaline; gradual wavy boundary.

Btg2—19 to 31 inches; gray (10YR 5/1) clay loam; moderate medium subangular blocky structure; firm; few distinct dark gray (10YR 4/1) clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) and few fine prominent light olive brown (2.5Y 5/4) masses of iron oxide accumulation in the matrix; slightly alkaline; abrupt wavy boundary.

2Btg3—31 to 36 inches; gray (10YR 5/1) gravelly clay loam; moderate medium subangular blocky structure; firm; very few faint gray (10YR 5/1) clay films on faces of peds; about 15 percent gravel; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; slightly alkaline; abrupt irregular boundary.

2Cg—36 to 80 inches; gray (10YR 5/1) gravelly sand; single grain; loose; about 15 percent gravel; strongly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 20 to 40 inches. The depth to carbonates ranges from 18 to 36 inches. The content of rock fragments ranges from 0 to 15 percent in the A horizon and from 3 to 25 percent in the Bt horizon.

The A horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. It is loam, mucky loam, fine sandy loam, silt loam, clay loam, silty clay loam, sandy loam, or sandy clay loam. Reaction ranges from slightly acid to slightly alkaline.

Some pedons do not have a Bg horizon. The Bt horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is sandy clay loam, loam, clay loam, or gravelly clay loam. Reaction ranges from slightly acid to slightly alkaline.

The 2C horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 to 4. It is gravelly sand, very gravelly sand, loamy sand, sand, stratified sand and gravel, gravelly coarse sand, very gravelly coarse sand, or coarse sand. The content of rock fragments ranges from 10 to 60 percent. Clay loam, silty clay loam, silty clay, or clay lacustrine material is below a depth of 40 inches in some pedons. Reaction is slightly alkaline or moderately alkaline.

ScuA—Sebewa loam, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Sebewa and similar soils: 85 percent
Rensselaer and similar soils: 10 percent
Homer and similar soils: 5 percent

Properties and Qualities of the Sebewa Soil

Parent material: Loamy outwash over sandy and gravelly outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 7.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Selfridge Series

The Selfridge series consists of very deep, somewhat poorly drained soils on moraines, lake plains, and low sand dunes of Wisconsinan age. These soils formed in 20 to 40 inches of sandy material and the underlying loamy glacial till. Permeability is rapid in the sandy layers and moderately slow or slow in the loamy till. Slopes range from 0 to 3 percent.

These soils are classified as loamy, mixed, active, mesic Aquic Arenic Hapludalfs.

Typical Pedon for the Series

Selfridge sand, on a convex slope of 1 percent, in a residential area at an elevation of 612 feet, in Monroe County, Michigan, about 5.5 miles southeast of the village of Scofield; 1,970 feet west and 1,280 feet south of the northeast corner of sec. 18, T. 6 S., R. 9 E.; USGS Monroe topographic quadrangle; latitude 41 degrees 58 minutes 28.07 seconds north and longitude 83 degrees 24 minutes 17.43 seconds west; NAD 1927:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sand, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; few roots; slightly acid; abrupt smooth boundary.

E—8 to 15 inches; brown (10YR 5/3) sand; single grain; loose; few roots; discontinuous streaks of strong brown (7.5YR 5/8) sand; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation; common fine faint grayish brown (10YR 5/2) iron oxide depletions; moderately acid; clear wavy boundary.

Bw—15 to 25 inches; yellowish brown (10YR 5/6) sand; single grain; loose; common fine faint yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; common fine distinct light brownish gray (10YR 6/2) iron oxide depletions in the matrix; neutral; abrupt wavy boundary.

2Bt1—25 to 29 inches; brown (10YR 4/3) sandy loam; weak coarse subangular blocky structure; friable; clay bridging between sand grains; common medium distinct yellowish brown (10YR 5/6) masses of iron oxide accumulation in the matrix; common medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; 1 percent fine gravel; neutral; clear wavy boundary.

2Bt2—29 to 32 inches; reddish brown (5YR 5/3) clay loam; weak fine angular blocky structure; firm; common faint clay films on faces of peds; many fine distinct strong brown (7.5YR 5/6) masses of iron oxide accumulation in the matrix; many fine distinct greenish gray (5GY 6/1) iron oxide depletions; 1 percent fine gravel; moderately alkaline; clear wavy boundary.

2Ckg—32 to 60 inches; reddish gray (5YR 5/2) clay loam; massive; firm; many gray (10YR 6/1) lime nodules; common fine distinct yellowish brown (10YR 5/6) masses of iron oxide accumulations and common fine distinct greenish gray (5GY 6/1) iron oxide depletions throughout; 1 percent fine gravel; strongly effervescent; moderately alkaline; gradual wavy boundary.

2Cg—60 to 80 inches; reddish gray (5YR 5/2) clay loam; massive; firm; common fine distinct yellowish brown (10YR 5/6) masses of iron accumulation; common fine distinct greenish gray (5GY 6/1) iron oxide depletions; 1 percent fine gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 24 to 50 inches. The thickness of the sandy material ranges from 20 to 40 inches. Reaction ranges from strongly acid to slightly alkaline. The content of rock fragments ranges from 0 to 5 percent in the A, E, and B horizons and from 0 to 10 percent in the 2B and 2C horizons.

The Ap or A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. Reaction ranges from strongly acid to neutral.

The E horizon, if it occurs, has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 4. It is sand, fine sand, loamy sand, or loamy fine sand. Reaction ranges from strongly acid to neutral.

The Bw horizon, if it occurs, has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is sand, fine sand, loamy sand, or loamy fine sand. Reaction ranges from strongly acid to neutral.

The 2Bt1 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 6. It is sandy loam, sandy clay loam, loam, or silt loam. The content of clay is less than 35 percent. Reaction ranges from strongly acid to slightly alkaline.

The 2Bt2 horizon has hue of 10YR, 7.5YR, 5YR, or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is clay loam or loam. The content of clay is less than 35 percent. Reaction ranges from strongly acid to slightly alkaline.

The 2C horizons have hue of 5YR, 7.5YR, or 10YR, value of 5 or 6, and chroma of 1 to 6. They are clay loam, loam, silt loam, or silty clay loam. In Pulaski County, these horizons are predominantly loam. The content of clay is less than 35 percent. Reaction is slightly alkaline or moderately alkaline.

SdzcB—Selfridge-Brems loamy fine sands, 1 to 4 percent slopes

Setting

Landform: Lake plains, outwash plains, and till plains
Position on the landform: Swells

Average Composition of Components

Selfridge and similar soils: 45 percent
Brems and similar soils: 35 percent
Budd and similar soils: 10 percent
Metea and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Selfridge Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Properties and Qualities of the Brems Soil

Parent material: Sandy outwash
Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 4.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

SgzA—Selfridge loamy fine sand, 0 to 1 percent slopes

Setting

Landform: Lake plains and till plains
Position on the landform: Swells

Average Composition of Components

Selfridge and similar soils: 75 percent
Aubbeenaubbee and similar soils: 15 percent
Brookston and similar soils: 5 percent
Crosier and similar soils: 5 percent

Properties and Qualities of the Selfridge Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

ShaA—Selfridge-Morocco loamy fine sands, 0 to 1 percent slopes

Setting

Landform: Lake plains, outwash plains, and till plains
Position on the landform: Swells

Average Composition of Components

Selfridge and similar soils: 45 percent
Morocco and similar soils: 35 percent
Seward and similar soils: 10 percent
Mermill and similar soils: 5 percent
Winamac and similar soils: 5 percent

Properties and Qualities of the Selfridge Soil

Parent material: Sandy outwash over fine-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Properties and Qualities of the Morocco Soil

Parent material: Sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 5.0 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Sloan Series

The Sloan series consists of very deep, very poorly drained soils on flood plains. These soils formed in alluvium. Permeability is moderate or moderately slow. Slopes are 0 to 1 percent.

These soils are classified as fine-loamy, mixed, superactive, mesic Fluvaquentic Endoaquolls.

Typical Pedon for the Series

Sloan silty clay loam, on a slope of less than 1 percent, in a cultivated field at an elevation of 900 feet, in Mercer County, Ohio, about 2$^{1}/_{2}$ miles north of Fort Recovery; 2,600 feet south and 1,980 feet west of the intersection of State Route 49 and Siegrist-Jutte Road; SW$^{1}/_{4}$NE$^{1}/_{4}$ sec. 6, T. 7 S., R. 1 E.; USGS Fort Recovery topographic quadrangle; latitude 40 degrees 27 minutes 28.8 seconds north and longitude 84 degrees 47 minutes 28 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, very dark grayish brown (10YR 3/2) rubbed, gray (10YR 5/1) dry; moderate fine and medium angular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

A—9 to 15 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate medium angular blocky structure; friable; many fine roots; few medium distinct dark yellowish brown (10YR 3/4) masses of iron accumulation throughout; neutral; gradual wavy boundary.

Bg1—15 to 21 inches; dark gray (10YR 4/1) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common medium distinct dark yellowish brown (10YR 4/4) masses of iron accumulation throughout; few dark iron and manganese concretions throughout; neutral; gradual wavy boundary.

Bg2—21 to 34 inches; gray (10YR 5/1) and dark gray (10YR 4/1) silty clay loam; weak medium subangular blocky structure; firm; few fine roots; many medium prominent brown (7.5YR 4/4) and few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation throughout; few dark iron and manganese concretions throughout; neutral; clear smooth boundary.

BCg—34 to 45 inches; gray (10YR 5/1) clay loam; massive; friable; many coarse prominent strong brown (7.5YR 5/6) masses of iron accumulation throughout; slightly alkaline; gradual wavy boundary.

Cg—45 to 80 inches; gray (10YR 5/1), stratified loam, silt loam, silty clay loam, and sandy loam; massive; friable; many coarse prominent yellowish brown (10YR 5/4 and 5/6) masses of iron accumulation throughout; slightly effervescent; slightly alkaline.

Range in Characteristics

The depth to the base of soil development ranges from 20 to 60 inches, and the depth to carbonates ranges from 22 to 80 inches. The mollic epipedon ranges from 10 to 24 inches in thickness and includes the upper part of the B horizon in some pedons. The particle-size control section typically is 22 to 35 percent clay and 15 to 35 percent fine sand or coarser material. Mean annual soil temperature ranges from 48 to 57 degrees F.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral in hue. They have value of 2 or 3 (4 or 5 dry) and chroma of 0 to 2. They typically are silty clay loam, silt loam, or loam, but the range includes clay loam and sandy loam. The content of rock fragments ranges from 0 to 5 percent. Reaction ranges from slightly acid to slightly alkaline.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 3 to 5 and chroma of 0 to 2. It is silty clay loam, clay loam, silt loam, or loam and is stratified in some pedons. The content of rock fragments ranges from 0 to 5 percent. Reaction ranges from slightly acid to slightly alkaline in the upper part and from neutral to moderately alkaline in the lower part.

Some pedons have a Bw horizon below a depth of 30 inches.

The BC or BCg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 4. It is silty clay loam, clay loam, silt loam, or loam. It is stratified in some pedons. The content of rock fragments ranges from 0 to 35 percent. Reaction ranges from neutral to moderately alkaline.

The Cg or C horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 to 4. It typically is stratified silty clay loam, clay loam, loam, silt loam, and sandy loam or the gravelly analogs of these textures. Some pedons have thin strata of sand and/or gravel. In sandy substratum phases, coarse sand and gravelly sand or gravelly loamy sand are below a depth of 60 inches. The content of rock fragments ranges from 0 to 35 percent. Reaction ranges from neutral to moderately alkaline. The till substratum phase is clay loam or silty clay loam. It is moderately alkaline.

SmsAK—Sloan silt loam, 0 to 1 percent slopes, occasionally flooded, brief duration

Setting

Landform: Backlands on flood plains
Position on the landform: Depressions

Average Composition of Components

Sloan and similar soils: 90 percent
Suman and similar soils: 10 percent

Properties and Qualities of the Sloan Soil

Parent material: Fine-loamy alluvium
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 10.8 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section

- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Southwest Series

The Southwest series consists of very deep, poorly drained soils in depressions on till plains, moraines, and outwash plains. These soils formed in recent alluvium over glaciofluvial deposits or glaciolacustrine deposits. Permeability is moderate in the recent alluvium and moderately slow in the buried soil. Slopes are 0 to 1 percent.

These soils are classified as fine-silty, mixed, superactive, nonacid, mesic Typic Fluvaquents.

Typical Pedon for the Series

Southwest silt loam, on a concave slope of 1 percent, in a cultivated field in Elkhart County, Indiana, about 3 miles north and 2 miles east of the town of Wakarusa; 129 feet west and 1,167 feet south of the northeast corner of sec. 8, T. 36 N., R. 5 E.; USGS Foraker topographic quadrangle; latitude 41 degrees 35 minutes 28 seconds north and longitude 85 degrees 57 minutes 53 seconds west; NAD 1927:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common very fine and fine roots throughout; slightly acid; clear wavy boundary.

Bg1—10 to 18 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium subangular blocky structure; friable; common very fine and fine roots throughout; many fine and medium moderate-continuity interstitial and tubular pores; common medium faint brown (10YR 4/3) iron oxide masses in the matrix; slightly acid; clear wavy boundary.

Bg2—18 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium subangular blocky structure; friable; common very fine and fine roots throughout; common fine and medium moderate-continuity interstitial and tubular pores; common medium faint brown (10YR 4/3) iron oxide masses in the matrix; slightly acid; clear wavy boundary.

2Ab—23 to 34 inches; black (10YR 2/1) silty clay loam; moderate fine subangular blocky structure; firm; common very fine and fine roots throughout; neutral; clear wavy boundary.

2Bgb—34 to 45 inches; gray (10YR 5/1) silty clay loam; moderate medium subangular blocky structure; firm; many medium distinct brown (10YR 5/3) and common fine prominent yellowish brown (10YR 5/8) iron oxide masses in the matrix; neutral; clear wavy boundary.

3Ab1—45 to 55 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak coarse subangular blocky structure; firm; common medium distinct dark yellowish brown (10YR 4/6) iron oxide masses in the matrix; neutral; gradual wavy boundary.

3Ab2—55 to 75 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak thick platy structure; friable; common medium distinct dark yellowish brown (10YR 4/6) iron oxide masses in the matrix; neutral; gradual wavy boundary.

3Cg—75 to 80 inches; dark gray (5Y 4/1) silt loam; massive; friable; slightly effervescent; slightly alkaline.

Range in Characteristics

The depth to carbonates ranges from 40 to more than 80 inches. The thickness of the overwash and the depth to a buried soil range from 20 to 40 inches. Below the overwash, the content of pebbles ranges from 0 to 5 percent.

The upper part of the control section (Ap horizon) has hue of 10YR, value of 4, and chroma of 2 or 3. It is silt loam. Reaction is slightly acid or neutral. Pedons in uncultivated areas have an A horizon. This horizon is less than 7 inches thick. It has value of 3.

The next part of the control section (Bg horizon) has hue of 10YR, value of 4 or 5, and chroma of 2 or less. It is silt loam or silty clay loam. Reaction is slightly acid or neutral.

The next part of the control section (2Ab, 2Bgb, and 3Ab horizons) has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 1 or 2. It is silty clay loam, silt loam, clay loam, or loam. Reaction ranges from slightly acid to slightly alkaline.

The lower part of the control section (3Cg or 3C horizon), if it occurs within a depth of 60 inches, has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 to 4. It is loam, silt loam, or clay loam. Reaction is slightly alkaline or moderately alkaline. Free calcium carbonates occur in this part of the profile. The calcium carbonate equivalent ranges from 5 to 25 percent.

SnlA—Southwest silt loam, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Depressions

Average Composition of Components

Southwest and similar soils: 75 percent
Brookston and similar soils: 10 percent

Washtenaw and similar soils: 10 percent
Wunabuna and similar soils: 5 percent

Properties and Qualities of the Southwest Soil

Parent material: Fine-silty alluvium over fine-silty glaciofluvial deposits
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 12.5 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Strole Series

The Strole series consists of very deep, somewhat poorly drained soils on glacial lakebeds of Wisconsinan age. These soils formed in lacustrine deposits of calcareous silty clay or clay. Permeability is slow. Slopes are 0 to 1 percent.

These soils are classified as fine, illitic, mesic Aquic Argiudolls.

Typical Pedon for the Series

Strole silt loam, on a nearly level, convex slope, in a cultivated field at an elevation of 652 feet, in Newton County, Indiana; 200 feet south and 400 feet east of the northwest corner of sec. 24, T. 28 N., R. 8 W.; USGS Goodland topographic quadrangle; latitude 40 degrees 51 minutes 54.9 seconds north and longitude 87 degrees 17 minutes 8.7 seconds west; NAD 1927:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium and coarse granular structure; friable; slightly acid; abrupt smooth boundary.

A—6 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate coarse granular and moderate fine subangular blocky structure; friable; slightly acid; clear wavy boundary.

Bt—12 to 16 inches; dark yellowish brown (10YR 4/4) silty clay; moderate coarse subangular blocky structure parting to moderate fine angular blocky; very firm; plastic; many distinct very dark grayish brown (10YR 3/2) and dark gray (10YR 4/1) clay films on faces of peds; thin discontinuous organic stains; few medium distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; moderately acid; clear wavy boundary.

Btg—16 to 30 inches; grayish brown (10YR 5/2) silty clay; moderate coarse and very coarse angular blocky structure; very firm; many prominent very dark gray (10YR 3/1) clay films on faces of peds; common distinct organic stains; common medium distinct dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in the matrix; moderately acid in the upper part changing gradually to neutral in the lower part; abrupt wavy boundary.

Cg—30 to 60 inches; gray (10YR 6/1) silty clay; massive; very firm; thin lenses and layers of fine sand and silt loam; many medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6 and 5/8) masses of iron oxide accumulation in the matrix; strongly effervescent; moderately alkaline; clear wavy boundary.

C—60 to 72 inches; brown (10YR 5/3) silty clay loam; massive; very firm; many medium distinct gray (10YR 6/1) iron oxide depletions in the matrix; light gray (10YR 7/1) calcium carbonate coats on bedding planes; strongly effervescent; moderately alkaline; clear wavy boundary.

C´g—72 to 80 inches; grayish brown (2.5Y 5/2) silty clay loam; massive; firm; many medium distinct light olive brown (2.5Y 5/6) masses of iron oxide accumulation in the matrix; light gray (10YR 7/1) calcium carbonate coats on bedding planes; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 24 to 40 inches and generally corresponds to the depth to carbonates. Reaction ranges from neutral to moderately acid in the A horizon and the upper part of the B horizon, ranges from moderately acid to slightly alkaline in the lower part of the B horizon, and is slightly alkaline or moderately alkaline in the C horizon. The average clay content in the particle-size control section is 45 to 60 percent. Pebbles do not occur within the series control section.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It commonly is silt loam or silty clay loam, but the range includes loam. Some pedons have a thin AB horizon.

The Bt horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 3 or 4. It is silty clay or clay.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2. It is silty clay or clay.

The C horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 3. The texture is silty clay, clay, or silty clay loam. Silty clay or clay is dominant within the series control section. Thin strata of silt loam, loam, or fine sand are in some pedons.

SwiA—Strole silt loam, 0 to 1 percent slopes

Setting

Landform: Lake plains
Position on the landform: Swells

Average Composition of Components

Strole and similar soils: 85 percent
Milford and similar soils: 5 percent
Radioville and similar soils: 5 percent
Whiskerville and similar soils: 5 percent

Properties and Qualities of the Strole Soil

Parent material: Clayey lacustrine deposits
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 8.0 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Sumava Series

The Sumava series consists of very deep, somewhat poorly drained soils on moraines. These soils formed in 20 to 40 inches of loamy outwash and the underlying till. Permeability is moderately rapid. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, active, mesic Aquic Argiudolls.

Typical Pedon for the Series

Sumava fine sandy loam, on a slope of 1 percent, in a cultivated field in Newton County, Indiana, about 2$^1/_2$ miles west of Mount Ayr; 500 feet west and 200 feet north of the southeast corner of sec. 17, T. 29 N., R. 8 W.; USGS Mount Ayr topographic quadrangle; latitude 40 degrees 57 minutes 21.22 seconds north and longitude 87 degrees 21 minutes 16.53 seconds west; NAD 1927:

Ap—0 to 12 inches; very dark gray (10YR 3/1) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak medium granular structure; very friable; few fine roots; neutral; abrupt smooth boundary.

Bt1—12 to 17 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; thin patchy prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few fine distinct grayish brown (2.5Y 5/2) iron oxide depletions in the matrix; neutral; clear wavy boundary.

Bt2—17 to 22 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; thin patchy very dark gray (10YR 3/1) organic coatings on faces of peds; thin patchy prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few fine distinct grayish brown (2.5Y 5/2) iron oxide depletions in the matrix; common medium distinct brownish yellow (10YR 6/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Bt3—22 to 29 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; friable; thin discontinuous prominent gray (10YR 5/1) clay films on faces of peds; few fine distinct grayish brown (2.5Y 5/2) iron oxide depletions in the matrix; few medium distinct brownish yellow (10YR 6/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Bw—29 to 36 inches; pale brown (10YR 6/3) fine sandy loam; many fine distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; weak coarse subangular blocky structure; very friable; slightly effervescent; slightly alkaline; clear wavy boundary.

2BC—36 to 39 inches; yellowish brown (10YR 5/4) loam; weak coarse subangular blocky structure; friable; light gray (10YR 6/1) iron oxide depletions in the matrix; common medium distinct brownish yellow (10YR 6/6) masses of iron oxide accumulation in the matrix; about 5 percent rock fragments; slightly effervescent; slightly alkaline; gradual wavy boundary.

2C1—39 to 63 inches; yellowish brown (10YR 5/4) loam; massive; friable; common medium light gray (10YR 6/1) iron oxide depletions throughout;

common medium distinct brownish yellow (10YR 6/6) masses of iron oxide accumulation throughout; common discontinuous prominent white (10YR 8/1) calcium carbonate coatings on horizontal and vertical fracture faces; about 5 percent rock fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

3C2—63 to 79 inches; yellowish brown (10YR 5/4) gravelly loamy sand; massive; friable; common medium gray (10YR 5/1) iron oxide depletions throughout; common medium distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/8) masses of iron oxide accumulation throughout; strongly effervescent; moderately alkaline; clear wavy boundary.

4C3—79 to 82 inches; yellowish brown (10YR 5/4) loam; massive; friable; about 5 percent rock fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 20 to 40 inches. The thickness of the loamy outwash ranges from 20 to 40 inches. The mollic epipedon ranges from 10 to 18 inches in thickness.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is sandy loam or fine sandy loam. The content of gravel ranges from 1 to 5 percent by volume. Reaction is neutral or slightly acid, depending on liming history.

The Bt and Bw horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. They are fine sandy loam or sandy loam. The content of clay ranges from 8 to 15 percent. The content of gravel ranges from 1 to 14 percent by volume. Reaction ranges from slightly acid to slightly alkaline.

The 2BC and 2C horizons have hue of 10YR, value of 4 to 6, and chroma of 3 or 4. They are loam or fine sandy loam. The content of clay ranges from 8 to 20 percent, and the content of sand ranges from 40 to 55 percent. The content of rock fragments ranges from 1 to 14 percent by volume. Reaction is slightly alkaline or moderately alkaline. The horizons have free carbonates. The calcium carbonate equivalent ranges from 10 to 40 percent.

The 3C horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is gravelly loamy sand or loamy sand. The content of gravel ranges from 1 to 20 percent by volume. Reaction is slightly alkaline or moderately alkaline. The horizon has free carbonates. The calcium carbonate equivalent ranges from 10 to 40 percent.

The 4C horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is loam or fine sandy loam. The content of clay ranges from 8 to 20 percent, and the content of sand ranges from 40 to 55 percent. The content of rock fragments ranges from 1 to 14 percent by volume. Reaction is slightly alkaline or moderately alkaline. The horizon has free carbonates. The calcium carbonate equivalent ranges from 10 to 40 percent.

SwxA—Sumava fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Ground moraines
Position on the landform: Swells

Average Composition of Components

Sumava and similar soils: 75 percent
Darroch and similar soils: 10 percent
Foresman and similar soils: 10 percent
Hoopeston and similar soils: 5 percent

Properties and Qualities of the Sumava Soil

Parent material: Coarse-loamy outwash over coarse-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Available water capacity: About 8.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Toto Series

The Toto series consists of very deep, very poorly drained soils on outwash plains, lake plains, and terraces. These soils formed in herbaceous organic material over coprogenous material (sedimentary peat), marly material, and sand deposits. Permeability is moderate or moderately rapid in the herbaceous organic material, slow in the coprogenous material and in the marly material, and rapid in the underlying sand. Slopes are 0 to 1 percent.

These soils are classified as coprogenous, euic, mesic Limnic Haplosaprists.

Typical Pedon for the Series

Toto muck, on a slope of less than 1 percent, in a cultivated field in Starke County, Indiana, about 2 miles south and 1/2 mile west of Knox; 580 feet west and 800 feet south of the center of sec. 34, T. 33 N., R. 2 W.; USGS Knox West topographic quadrangle; latitude 41 degrees 15 minutes 50.32 seconds north and longitude 86 degrees 37 minutes 56.53 seconds west; NAD 1927:

Op—0 to 9 inches; muck, black (N 2.5/0) broken face and rubbed; 26 percent fiber, 4 percent rubbed; weak medium granular structure; very friable; many very fine roots; mostly herbaceous fiber; 11 percent mineral content; neutral (pH 6.8 in 0.01M calcium chloride); abrupt smooth boundary.

Oa1—9 to 18 inches; muck, black (N 2.5/0) broken face and rubbed; 18 percent fiber, 3 percent rubbed; moderate medium subangular blocky structure; friable; common very fine roots; mostly herbaceous fiber; 9 percent mineral content; neutral (pH 6.8 in 0.01M calcium chloride); abrupt wavy boundary.

Oa2—18 to 24 inches; muck, very dark brown (10YR 2/2) broken face and rubbed; 26 percent fiber, 6 percent rubbed; moderate coarse subangular blocky structure; friable; few very fine roots; mostly herbaceous fiber; 5 percent mineral content; neutral (pH 6.8 in 0.01M calcium chloride); abrupt smooth boundary.

Lco—24 to 30 inches; very dark grayish brown (2.5Y 3/2) coprogenous silt loam; moderate medium platy structure; friable; many fine prominent strong brown (7.5YR 5/6) masses of iron oxide accumulation in the matrix; sodium pyrophosphate extract is very pale brown (10YR 8/2); neutral; abrupt irregular boundary.

Lma—30 to 38 inches; gray (5Y 6/1) marly silt loam; massive; very friable; many fine prominent yellowish brown (10YR 5/8) and strong brown (7.5YR 5/6) masses of iron oxide accumulation in the matrix; common coarse distinct gray (N 5/0) iron oxide depletions in the matrix; many partially decomposed plant fibers; common light gray (10YR 7/1) shell fragments; violently effervescent; moderately alkaline; abrupt irregular boundary.

2Cg—38 to 48 inches; dark gray (10YR 4/1) sand; single grain; loose; common fine distinct brown (10YR 5/3), many fine distinct strong brown (7.5YR 5/8), and common fine prominent yellowish red (5YR 5/6) masses of iron oxide accumulation in the matrix; strongly effervescent; moderately alkaline; clear wavy boundary.

2C—48 to 80 inches; yellowish brown (10YR 5/4) sand; single grain; loose; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to sandy material ranges from 30 to 72 inches. Some layers contain woody fragments 1 to 4 inches in diameter.

The Oa horizon has hue of 10YR, value of 2 to 3, and chroma of 1 or 2, or it is neutral in hue and has value of 2.5. It is primarily muck (sapric material); however, thin layers of mucky peat (hemic material) with a combined thickness of less than 6 inches are in some pedons. Mineral content is less than 25 percent. Reaction ranges from moderately acid to neutral in 0.01M calcium carbonate.

The Lco horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 or 4, and chroma of 2 to 4. It is coprogenous silt loam or coprogenous silty clay loam. Reaction is neutral or slightly alkaline.

The Lma horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 to 6. It is marly silt loam or marly silty clay loam. Reaction is slightly alkaline or moderately alkaline.

The 2C or 2Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 6. Reaction ranges from neutral to moderately alkaline.

TmaAN—Toto muck, drained, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Toto and similar soils: 70 percent
Ackerman and similar soils: 10 percent
Muskego and similar soils: 10 percent
Edselton and similar soils: 5 percent
Madaus and similar soils: 5 percent

Properties and Qualities of the Toto Soil

Parent material: Herbaceous organic material over coprogenous material over marl over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 12.1 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

TmaAU—Toto muck, undrained, 0 to 1 percent slopes

Setting

Landform: Outwash plains
Position on the landform: Depressions

Average Composition of Components

Toto and similar soils: 65 percent
Ackerman and similar soils: 10 percent
Muskego and similar soils: 10 percent
Edselton and similar soils: 5 percent
Madaus and similar soils: 5 percent
Water: 5 percent

Properties and Qualities of the Toto Soil

Parent material: Herbaceous organic material over coprogenous material over marl over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 12.1 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- "Agronomy" section
- "Forestland" section
- "Recreation" section
- "Wildlife Habitat" section
- "Engineering" and "Soil Properties" sections

UbrA—Udorthents, clayey, 0 to 1 percent slopes

This map unit is on lake plains in areas from which clayey material has been removed.

Areas of this unit generally consist of mixed, clayey soil materials. Included in mapping are areas where various thicknesses of soil materials have been removed and spoil material has been piled.

Onsite investigation is needed to determine site characteristics and interpretive information.

Whiskerville Series

The Whiskerville series consists of very deep, moderately well drained soils on lake plains and outwash plains. These soils formed in loamy and sandy outwash materials overlying lacustrine deposits. Permeability is moderate in the subsoil and slow in the underlying lacustrine deposits. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, active, mesic Aquollic Hapludalfs.

Typical Pedon for the Series

Whiskerville fine sandy loam, on a slope of 1 percent, in a cultivated field at an elevation of 675 feet, in Pulaski County, Indiana, about 3 miles east and 2 miles south of Francesville; 1,500 feet east and 550 feet north of the southwest corner of sec. 13, T. 29 N., R. 4 W.; USGS Monon NE topographical quadrangle; latitude 40 degrees 57 minutes 27.29 seconds north and longitude 86 degrees 49 minutes 51.16 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; very friable; few very fine roots throughout; common fine interstitial and tubular pores; moderately acid; abrupt smooth boundary.

Bt1—9 to 17 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate fine subangular blocky structure; very friable; few very fine roots throughout; common fine interstitial and tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; few fine rounded dark brown (7.5YR 3/4) masses of iron and manganese accumulation; slightly acid; clear wavy boundary.

Bt2—17 to 23 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; very friable; common very fine interstitial and tubular pores; few distinct brown (10YR 4/3) clay films on faces of peds; common fine rounded black (N 2/0) masses of iron and manganese accumulation throughout; few fine distinct light brownish gray (10YR 6/2) iron depletions in the matrix; common fine rounded yellowish brown

(10YR 5/8) iron accumulations in the matrix; neutral; clear wavy boundary.

Bt3—23 to 31 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; very friable; common very fine interstitial and tubular pores; very few distinct patchy brown (10YR 4/3) clay films on faces of peds; few fine rounded dark brown (7.5YR 3/4) iron and manganese accumulations; common medium distinct dark grayish brown (10YR 4/2) iron depletions in the matrix; neutral; clear wavy boundary.

BC—31 to 42 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; very friable; very fine interstitial and tubular pores; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; many medium distinct grayish brown (10YR 5/2) iron depletions in the matrix; neutral; abrupt smooth boundary.

2Cg—42 to 54 inches; grayish brown (2.5Y 5/2) silty clay loam; weak coarse prismatic structure; firm; very fine interstitial and tubular pores; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; common medium prominent gray (N 6/0) iron depletions in the matrix; few gray (10YR 6/1) carbonate coatings; strongly effervescent; moderately alkaline; clear wavy boundary.

2C1—54 to 69 inches; brown (10YR 5/3) silty clay; weak coarse prismatic structure; firm; many medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; many medium faint grayish brown (10YR 5/2) iron depletions in the matrix; few gray (10YR 6/1) carbonate coatings; strongly effervescent; moderately alkaline; clear wavy boundary.

2C2—69 to 80 inches; brown (10YR 5/3) silty clay; weak coarse prismatic structure; firm; common medium prominent yellowish brown (10YR 5/8) masses of iron accumulation in the matrix; many medium faint grayish brown (10YR 5/2) iron depletions in the matrix; few light gray (10YR 7/1) carbonate coatings; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 30 to 50 inches. The depth to carbonates ranges from 30 to 60 inches. The depth to the lacustrine deposits ranges from 40 to 60 inches. The particle-size control section averages less than 18 percent clay. The content of rock fragments ranges from 0 to 5 percent, by volume, in the A and B horizons.

The A or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. It is loamy sand, sandy loam, fine sandy loam, or loamy fine sand. Reaction ranges from moderately acid to neutral.

Some pedons have an EB or BE horizon. This horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 4. It is loamy fine sand, loamy sand, sandy loam, or fine sandy loam. Reaction ranges from moderately acid to neutral.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is dominantly fine sandy loam or sandy loam, but it contains bands of sandy clay loam in some pedons. Reaction ranges from moderately acid to neutral.

The BC horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It is fine sandy loam, sandy loam, loamy fine sand, or loamy sand. Reaction ranges from slightly acid to slightly alkaline.

The 2C horizons have hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 to 4. The texture is silty clay loam or silty clay. Reaction is slightly alkaline or moderately alkaline.

WmgA—Whiskerville-Bronson fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Lake plains and outwash plains
Position on the landform: Swells

Average Composition of Components

Whiskerville and similar soils: 50 percent
Bronson and similar soils: 35 percent
Medaryville and similar soils: 10 percent
Goodell and similar soils: 5 percent

Properties and Qualities of the Whiskerville Soil

Parent material: Coarse-loamy outwash over clayey lacustrine deposits
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 8.7 inches to a depth of 60 inches

Properties and Qualities of the Bronson Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Available water capacity: About 7.1 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Whitepost Series

The Whitepost series consists of very deep, poorly drained and very poorly drained soils on outwash plains or lake plains. These soils formed in loamy and sandy sediments overlying silty lacustrine sediments. Permeability is moderately rapid in the loamy outwash sediments and slow or very slow in the silty lacustrine sediments. Slopes are 0 to 1 percent.

These soils are classified as coarse-loamy, mixed, superactive, mesic Typic Endoaquolls.

Typical Pedon for the Series

Whitepost fine sandy loam, on a nearly level slope of less than 1 percent, in a cultivated field at an elevation of 677 feet, in Pulaski County, Indiana, about 3 miles north and 1 mile west of Francesville; 75 feet east and 1,000 feet south of the northwest corner of sec. 30, T. 30 N., R. 4 W.; USGS Medaryville topographic quadrangle; latitude 41 degrees 1 minute 30.1 seconds north and longitude 86 degrees 54 minutes 38.3 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark brown (10YR 2/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; common very fine to medium roots throughout; common fine tubular pores; neutral; abrupt smooth boundary.

A—9 to 12 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; friable; common very fine and fine roots throughout; common fine tubular pores; neutral; clear wavy boundary.

Bg1—12 to 17 inches; grayish brown (10YR 5/2) fine sandy loam; moderate medium subangular blocky structure; very friable; common very fine roots throughout; common fine tubular pores; common medium prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Bg2—17 to 25 inches; gray (10YR 5/1) fine sandy loam; moderate medium subangular blocky structure; friable; common very fine roots throughout; common medium distinct yellowish brown (10YR 5/4) and common medium prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Bg3—25 to 31 inches; gray (2.5Y 6/1) loamy fine sand; weak coarse subangular blocky structure; very friable; common very fine roots throughout; common fine tubular pores; many coarse distinct yellowish brown (10YR 5/4) and few fine prominent dark yellowish brown (10YR 4/6) masses of iron oxide accumulation in the matrix; neutral; clear wavy boundary.

Bg4—31 to 40 inches; grayish brown (10YR 5/2) loamy fine sand; single grain; loose; neutral; clear wavy boundary.

Cg1—40 to 48 inches; gray (10YR 5/1) fine sand; single grain; loose; slightly effervescent; slightly alkaline; clear wavy boundary.

Cg2—48 to 54 inches; grayish brown (10YR 5/2) fine sand; single grain; loose; strongly effervescent; moderately alkaline; clear wavy boundary.

2Cg3—54 to 80 inches; gray (10YR 5/1) silty clay; massive; firm; strongly effervescent; moderately alkaline.

Range in Characteristics

The depth to the base of the cambic horizon ranges from 24 to 50 inches. The depth to silty lacustrine deposits ranges from 40 to 60 inches. The content of rock fragments ranges from 0 to 5 percent, by volume, in the outwash. The content of sand averages more than 50 percent fine sand or coarser sand in the outwash.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 2. It is fine sandy loam, loam, loamy fine sand, sandy loam, mucky sandy loam, or mucky fine sandy loam. Reaction ranges from moderately acid to neutral.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2 and contains redoximorphic features. The texture is fine sandy loam, sandy loam, loamy sand, or loamy fine sand. In some pedons the horizon contains strata of loam. The particle-size control section averages more than 15 percent silt plus 1.5 times the clay content. Reaction ranges from moderately acid to neutral.

Some pedons have a BCg horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is loamy sand, loamy fine sand, sand, or fine sand. Reaction is neutral or slightly alkaline.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is sand or fine sand. Reaction is slightly alkaline or moderately alkaline.

The 2Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is silt loam, silty clay loam, or silty clay. The depth to the top of the 2Cg horizon commonly ranges from 40 to 60 inches. Reaction is slightly alkaline or moderately alkaline.

WmiA—Whitepost-Gilford fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Lake plains and outwash plains
Position on the landform: Depressions

Average Composition of Components

Whitepost and similar soils: 45 percent
Gilford and similar soils: 35 percent
Maumee and similar soils: 10 percent
Brookston and similar soils: 5 percent
Radioville and similar soils: 5 percent

Properties and Qualities of the Whitepost Soil

Parent material: Coarse-loamy and/or sandy outwash over clayey lacustrine deposits
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 7.3 inches to a depth of 60 inches

Properties and Qualities of the Gilford Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Available water capacity: About 6.4 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Williamstown Series

The Williamstown series consists of very deep, moderately well drained soils on till plains and moraines. These soils formed in calcareous glacial till. They are moderately deep to dense glacial till. Permeability is moderate or moderately slow in the surface layer and the subsoil and slow or very slow in the underlying dense till. Slopes range from 0 to 5 percent.

These soils are classified as fine-loamy, mixed, active, mesic Aquic Hapludalfs.

Typical Pedon for the Northern Part of MLRA 111

Williamstown loam, on a convex slope of 4 percent, in a cultivated field in Elkhart County, Indiana, about 4 miles east and 1 mile north of Nappanee; 1,475 feet south and 2,030 feet east of the northwest corner of sec. 26, T. 35 N., R. 5 E.; USGS Nappanee East topographic quadrangle; latitude 41 degrees 27 minutes 37 seconds north and longitude 85 degrees 55 minutes 5 seconds west; NAD 1927:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many very fine and fine roots throughout; common very fine and fine tubular pores; 2 percent rock fragments; strongly acid; abrupt smooth boundary.

EB—7 to 12 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; many very fine and fine roots throughout; common very fine and fine tubular pores; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds and common distinct continuous dark grayish brown (10YR 4/2) organic coats in root channels and/or pores and faint discontinuous light yellowish brown (10YR 6/4) silt coats on faces of peds; 2 percent rock fragments; strongly acid; clear wavy boundary.

Bt1—12 to 20 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; firm; common very fine roots throughout; common very fine and fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores, few distinct dark grayish brown (10YR 4/2) organic coats in root channels and/or pores, and common faint light yellowish brown (10YR 6/4) silt coats on faces of peds; few black (N 2/0) masses of iron-manganese accumulation; common medium distinct grayish brown (10YR 5/2) iron oxide depletions; 2 percent rock fragments; strongly acid; clear wavy boundary.

Bt2—20 to 27 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; firm; common very fine roots throughout; common very fine and fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores and few dark grayish brown (10YR 4/2) organic coats in root channels and/or pores; few black (N 2/0) masses of iron-manganese accumulation; common medium distinct grayish brown (10YR 5/2) iron oxide depletions; 2 percent rock fragments; neutral; clear wavy boundary.

Bt3—27 to 34 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; common very fine roots throughout; common very fine and fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds and in pores; 2 percent rock fragments; neutral; clear wavy boundary.

BCt1—34 to 44 inches; yellowish brown (10YR 5/4) loam; weak coarse subangular blocky structure; friable; few very fine roots between peds; few fine tubular pores; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores; slightly effervescent; 5 percent rock fragments; slightly alkaline; clear wavy boundary.

BCt2—44 to 56 inches; yellowish brown (10YR 5/4) loam; weak coarse subangular blocky structure parting to weak fine subangular blocky; friable; few fine tubular pores; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds and in pores; slightly effervescent; 5 percent rock fragments; slightly alkaline; clear wavy boundary.

Cd1—56 to 66 inches; yellowish brown (10YR 5/4) loam; weak very coarse prismatic structure parting to weak medium platy; firm; few fine tubular pores; strongly effervescent; 5 percent rock fragments; slightly alkaline; clear wavy boundary.

Cd2—66 to 80 inches; yellowish brown (10YR 5/4) loam; weak very coarse prismatic structure; firm; yellowish brown (10YR 5/6) oxidized zone 2 to 5 millimeters thick along vertical fracture planes that are 6 to 10 inches apart; strongly effervescent; 5 percent rock fragments; slightly alkaline.

Range in Characteristics

The depth to the base of the argillic horizon and the depth to free carbonates range from 20 to 40 inches.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is loam or fine sandy loam. The content of rock fragments ranges from 0 to 10 percent. Reaction ranges from strongly acid to neutral.

The E or EB horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam, clay loam, or loam. The content of rock fragments ranges from 0 to 10 percent. Reaction ranges from strongly acid to neutral.

The Bt or 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It is clay loam or loam. The content of rock fragments ranges from 0 to 10 percent. Reaction ranges from strongly acid to neutral.

The BC or 2BC horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. It is loam or fine sandy loam. The content of rock fragments ranges from 1 to 10 percent. Reaction ranges from neutral to moderately alkaline.

The Cd horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is loam or fine sandy loam. The content of rock fragments ranges from 1 to 10 percent. Reaction is slightly alkaline or moderately alkaline.

WoeB—Williamstown-Crosier fine sandy loams, 1 to 5 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells and backslopes

Average Composition of Components

Williamstown and similar soils: 50 percent
Crosier and similar soils: 35 percent
Metea and similar soils: 5 percent
Miami and similar soils: 5 percent
Selfridge and similar soils: 5 percent

Properties and Qualities of the Williamstown Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 1 to 5 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Moderately well drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Properties and Qualities of the Crosier Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 1 to 4 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Somewhat poorly drained

Available water capacity: About 4.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

WogA—Williamstown fine sandy loam, 0 to 2 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Williamstown and similar soils: 70 percent
Crosier and similar soils: 10 percent
Riddles and similar soils: 10 percent
Metea and similar soils: 5 percent
Moon and similar soils: 5 percent

Properties and Qualities of the Williamstown Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 0 to 2 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Moderately well drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

WoxA—Williamstown-Winamac fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Outwash plains and till plains
Position on the landform: Swells

Average Composition of Components

Williamstown and similar soils: 45 percent
Winamac and similar soils: 35 percent
Bronson and similar soils: 10 percent
Conover and similar soils: 5 percent
Goodell and similar soils: 5 percent

Properties and Qualities of the Williamstown Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Moderately well drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Properties and Qualities of the Winamac Soil

Parent material: Coarse-loamy and/or sandy outwash over coarse-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.8 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

WoxB—Williamstown-Winamac fine sandy loams, 1 to 5 percent slopes

Setting

Landform: Till plains and outwash plains
Position on the landform: Swells and backslopes

Average Composition of Components

Williamstown and similar soils: 45 percent
Winamac and similar soils: 40 percent
Conover and similar soils: 5 percent
Goodell and similar soils: 5 percent
Riddles and similar soils: 5 percent

Properties and Qualities of the Williamstown Soil

Parent material: Fine-loamy till over loamy basal till
Slope: 1 to 5 percent
Depth to restrictive feature: 24 to 40 inches to dense material
Drainage class: Moderately well drained
Available water capacity: About 4.7 inches to a depth of 60 inches

Properties and Qualities of the Winamac Soil

Parent material: Coarse-loamy and/or sandy outwash over coarse-loamy till
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.8 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Winamac Series

The Winamac series consists of very deep, moderately well drained soils on till plains. These soils formed in loamy and sandy outwash and the underlying glacial till. Permeability is moderately rapid in the loamy outwash and slow in the glacial till. Slopes range from 0 to 5 percent.

These soils are classified as coarse-loamy, mixed, active, mesic Aquollic Hapludalfs.

Typical Pedon for the Series

Winamac fine sandy loam (fig. 22), on a slope of 1 percent, in a cultivated field at an elevation of 675 feet, in Pulaski County, Indiana, 3 miles south and 2 miles east of Francesville; 694 feet north and 2,180 feet east of the southwest corner of sec. 23, T. 29 N., R. 4 W.; USGS Monon NE topographic quadrangle; latitude 40 degrees 56 minutes 34.97 seconds north and longitude 86 degrees 50 minutes 44.88 seconds west; NAD 1927:

Ap—0 to 9 inches; very dark brown (10YR 2/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine and fine roots; common fine interstitial and tubular pores; strongly acid; abrupt smooth boundary.

A—9 to 12 inches; brown (10YR 4/3) fine sandy loam; moderate medium subangular blocky structure; friable; few very fine and fine roots; common fine interstitial and tubular pores; very strongly acid; clear wavy boundary.

Bt1—12 to 21 inches; yellowish brown (10YR 5/4) very fine sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; common fine interstitial and tubular pores; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—21 to 26 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate coarse subangular blocky structure; friable; few very fine and fine roots; common fine interstitial and tubular pores; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine prominent yellowish brown (10YR 5/8) masses of iron oxide accumulation in the matrix; common fine distinct grayish brown (10YR 5/2) iron oxide depletions in the matrix; very strongly acid; clear wavy boundary.

Bt3—26 to 33 inches; yellowish brown (10YR 5/6) very fine sandy loam; moderate coarse subangular blocky structure; friable; few faint grayish brown (10YR 5/2) clay films on faces of peds and in pores; many medium prominent light brownish gray (10YR 6/2) iron oxide depletions in the matrix; very strongly acid; clear wavy boundary.

BC—33 to 44 inches; yellowish brown (10YR 5/6) very fine sandy loam; weak coarse subangular blocky structure; friable; many medium prominent grayish brown (10YR 5/2) iron oxide depletions in the matrix; few black (N 2/0) iron-manganese nodules; many medium prominent grayish brown (10YR 5/2) iron oxide depletions in the matrix; strongly acid; abrupt smooth boundary.

2BC1—44 to 51 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; common medium faint brown (10YR 5/3) iron oxide depletions in the matrix; slightly acid; clear smooth boundary.

2BC2—51 to 58 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; common medium faint brown (10YR 5/3) iron oxide depletions in the matrix; slightly effervescent; moderately alkaline; abrupt smooth boundary.

3C—58 to 80 inches; brown (10YR 5/3) fine sandy loam; massive; friable; common medium faint grayish brown (10YR 5/2) iron oxide depletions in the matrix; slightly effervescent; moderately alkaline; 7 percent gravel and cobbles.

Range in Characteristics

The depth to the base of the argillic horizon ranges from 30 to 50 inches. The depth to free carbonates and the depth to loamy glacial till range from 40 to 60 inches. The content of rock fragments ranges from 0 to 5 percent, by volume, in the loamy and sandy outwash.

The A or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. In the lower part of the A horizon, the range includes value of 4. The horizon is loamy fine sand, fine sandy loam, loamy sand, or sandy loam. Reaction ranges from very strongly acid to neutral.

Some pedons have an EB or BE horizon. This horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 4. It is loamy fine sand, loamy sand, sandy loam, or fine sandy loam. Reaction ranges from very strongly acid to neutral.

The Bt or BC horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is sandy loam, sandy clay loam, very fine sandy loam, or fine sandy loam. It averages less than 18 percent clay. Reaction ranges from very strongly acid to neutral.

The 2BC or 2C horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It is fine sand or sand. Reaction ranges from slightly acid to moderately alkaline.

The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4. It is fine sandy loam or loam. The content of rock fragments ranges from 2 to 10 percent. Reaction is slightly alkaline or moderately alkaline.

WpaA—Winamac-Bronson fine sandy loams, 0 to 1 percent slopes

Setting

Landform: Till plains and outwash plain
Position on the landform: Swells

Average Composition of Components

Winamac and similar soils: 45 percent
Bronson and similar soils: 40 percent
Brady and similar soils: 5 percent
Budd and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Winamac Soil

Parent material: Coarse-loamy and/or sandy outwash over coarse-loamy till
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.8 inches to a depth of 60 inches

Properties and Qualities of the Bronson Soil

Parent material: Coarse-loamy outwash over sandy outwash
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.2 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

WpbA—Winamac fine sandy loam, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Winamac and similar soils: 85 percent
Bronson and similar soils: 5 percent
Budd and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Winamac Soil

Parent material: Coarse-loamy and/or sandy outwash over coarse-loamy till
Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.8 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

WpbB—Winamac fine sandy loam, 1 to 5 percent slopes

Setting

Landform: Till plains
Position on the landform: Swells

Average Composition of Components

Winamac and similar soils: 80 percent
Budd and similar soils: 10 percent
Bronson and similar soils: 5 percent
Morocco and similar soils: 5 percent

Properties and Qualities of the Winamac Soil

Parent material: Coarse-loamy and/or sandy outwash over coarse-loamy till
Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Available water capacity: About 7.8 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Wunabuna Series

The Wunabuna series consists of very deep, very poorly drained soils in potholes and closed depressions on till plains and moraines. These soils formed in mineral slope alluvium overlying herbaceous organic material. Permeability is moderate in the mineral material and ranges from moderately slow to moderately rapid in the underlying organic material. Slopes are 0 to 1 percent.

These soils are classified as fine, mixed, superactive, nonacid, mesic Fluvaquentic Endoaquepts.

Typical Pedon for the Series

Wunabuna silt loam, on a nearly level, linear slope, in a cultivated field at an elevation of 773 feet, in Elkhart County, Indiana, about $1^1/_2$ miles southwest of the town of Dunlap; 2,481 feet south and 90 feet west of the northeast corner of sec. 34, T. 37 N., R. 5 E.; USGS Foraker topographic quadrangle; latitude 41 degrees 36 minutes 58 seconds north and longitude 85 degrees 55 minutes 35 seconds west; NAD 1927:

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common fine and medium roots throughout; common fine to coarse interstitial and tubular pores throughout; neutral; abrupt smooth boundary.

A1—7 to 15 inches; dark brown (10YR 3/3) silty clay loam, light brownish gray (10YR 6/2) dry; weak coarse subangular blocky structure; very firm; common fine and medium roots throughout; common fine to coarse interstitial and tubular pores throughout; neutral; clear smooth boundary.

A2—15 to 21 inches; dark brown (10YR 3/3) silty clay loam, light brownish gray (10YR 6/2) dry; moderate medium subangular blocky structure; firm; common fine and medium roots throughout; common fine to coarse tubular pores throughout; neutral; clear smooth boundary.

Bg—21 to 32 inches; dark gray (10YR 4/1) silty clay loam; moderate medium angular blocky structure; firm; many continuous distinct very dark gray (10YR 3/1) organic coatings on vertical and horizontal faces of peds; common fine and medium roots throughout; common fine to coarse tubular pores throughout; many fine and medium distinct dark yellowish brown (10YR 4/4) masses of iron oxide accumulation in the matrix; neutral; clear smooth boundary.

2Ab—32 to 38 inches; very dark gray (10YR 3/1) silty clay; moderate medium subangular blocky structure; firm; common fine and medium roots throughout; common coarse tubular pores throughout; common continuous distinct dark grayish brown (10YR 4/2) clay depletions in root channels and pores; neutral; abrupt smooth boundary.

3Oa1—38 to 60 inches; muck (sapric material), black (10YR 2/1) broken face, black (N 2.5/) rubbed, very dark brown (10YR 2/2) after exposure to air; about 5 percent fiber, 1 percent rubbed; massive; very friable; common coarse interstitial and tubular pores throughout; slightly alkaline; gradual smooth boundary.

3Oa2—60 to 80 inches; muck (sapric material), black (10YR 2/1) broken face, black (N 2.5/) rubbed, very dark brown (10YR 2/2) after exposure to air; about 10 percent fiber, 3 percent rubbed; massive; very friable; slightly acid.

Range in Characteristics

The depth to organic materials ranges from 16 to 40 inches. The content of clay in the particle-size control section averages more than 35 percent.

The Ap and A horizons have hue of 10YR, value of 2 to 4, and chroma of 1 to 3. Where values are 2 or 3, dry values are 6 or more, or the subhorizons with these values are less than 10 inches thick or less than one-third the thickness between the top of the epipedon and the bottom of the cambic horizon. The Ap and A horizons are silt loam or silty clay loam. Reaction ranges from slightly acid to slightly alkaline.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is silt loam, silty clay loam, or silty clay. Reaction ranges from slightly acid to slightly alkaline.

The 2Ab horizon has hue of 10YR or is neutral in hue. It has value of 2 to 3 and chroma of 0 to 3. It is silt loam, silty clay loam, or silty clay. Reaction ranges from slightly acid to slightly alkaline.

The 3Oa horizon has hue of 10YR or is neutral in hue. It has value of 2 to 3 chroma of 0 to 2. It is sapric material. Reaction ranges from strongly acid to slightly alkaline.

WrxAN—Wunabuna silt loam, drained, 0 to 1 percent slopes

Setting

Landform: Till plains
Position on the landform: Depressions

Average Composition of Components

Wunabuna and similar soils: 90 percent
Brookston and similar soils: 5 percent
Gilford and similar soils: 5 percent

Properties and Qualities of the Wunabuna Soil

Parent material: Clayey alluvium over herbaceous organic material
Slope: 0 to 1 percent
Ponding frequency: Frequent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Available water capacity: About 16.6 inches to a depth of 60 inches

Management

For general and detailed information about managing this map unit, see the following sections in this publication:

- “Agronomy” section
- “Forestland” section
- “Recreation” section
- “Wildlife Habitat” section
- “Engineering” and “Soil Properties” sections

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Agronomy

This section provides information about the use and management of the soils in the survey area for agronomic purposes.

Crops and Pasture

Joseph A. O'Donnell, resource conservationist, SWCD, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Soil Series and Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1997, about 204,000 acres in the county was planted to grain crops, mainly corn, soybeans, popcorn, and wheat; 4,000 acres was used for alfalfa in rotation with grain crops, such as corn and soybeans; and 5,500 acres was permanent pasture (Gann and Liles, 1999). Some acreage is used for specialty crops, such as peppermint, spearmint, seed corn, sorghum, Christmas trees, blueberries, sweet corn, potatoes, snap beans, and ornamental trees and shrubs (fig. 23).

In the 10-year period from 1987 to 1997, the amount of farmland in the county dropped from 243,500 acres to 236,300 acres. About 700 acres per year is converted from farmland to urban and industrial areas; the soils in some of these converted areas are classified as prime farmland.

Livestock production provides a significant amount of income for Pulaski County farmers, although the numbers of beef cattle, dairy cows, sheep, and hogs have been declining recently. Pulaski County does have a large egg production facility that provides a good market for corn and soybean producers. Livestock production in the county involves opportunities and challenges for soil management through the utilization of manure.

The paragraphs that follow describe the major management concerns affecting crops and pasture in

Figure 23.—Mint growing in an area of Muskego muck, drained, 0 to 1 percent slopes.

the survey area and the management practices that may be used successfully.

Erosion is a major hazard in Pulaski County. Loss of the surface layer through erosion reduces the productivity of the soils. As the surface layer is eroded, nutrients and organic matter are removed and the subsoil, which has a low content of organic matter and low fertility, is incorporated into the plow layer. The subsoil material can restrict seed germination and the availability of plant nutrients. Exposure of the subsoil can increase the hazard of erosion.

Water erosion is a hazard on sloping soils that have a loamy surface layer. Examples are Williamstown and Miami soils. Water erosion can result in clogged tile drains and the sedimentation of creeks, ditches, and waterways. Sediment that contains fertilizer and pesticides can reduce the quality of the water. Controlling erosion reduces the runoff rate, increases the rate of water infiltration, and minimizes the loss of organic matter and the amount of sediment that enters the waterways.

A system of conservation tillage that leaves crop residue on the surface increases the rate of water infiltration and reduces the runoff rate and the hazard of erosion. No-till cropping systems require high levels of management. Herbicides and insecticides are used to control weeds and insects. No-till farming is especially effective in minimizing erosion on the lighter colored, well drained, sloping soils in the county. It minimizes soil compaction, increases the content of organic matter, and is less labor intensive than other systems. In 2000, about 72,000 acres of cropland in the county was planted using a no-till or ridge-till method and another 18,000 acres was planted in such a way that crop residue was left on at least 30 percent of the surface. These acreages represent 24 percent of the corn, 64 percent of the soybeans, and 43 percent of the wheat grown in the county. No-till farming has many conservation and ecological benefits, including fuel savings, wildlife enhancement, and improvement of soil tilth.

Contour farming can be used in a few areas of the county. In areas where slopes are short and irregular, however, this practice is difficult to manage. Other types of conservation measures may be more suitable in these areas.

Grassed waterways are used in areas that have undulating and gently rolling slopes. Grassed waterways help to control gully erosion on sloping soils. They also stabilize areas that are already eroded. Subsurface drains are installed beneath the waterways to remove excess internal water. Removing this water enhances the growth of plants and facilitates the use of machinery. Grassed waterways work effectively on such soils as Crosier, Williamstown, and Miami soils.

Grade-stabilization structures are needed in areas where a change in grade allows water to drop so quickly that erosion occurs. These structures are commonly needed where a grassed waterway enters an open ditch.

Water- and sediment-control basins, terraces, and diversions help to control runoff on gently sloping and moderately sloping soils. Terraces and water- and sediment-control basins store runoff behind earthen dams until the water can enter subsurface drains. Diversions route water to grassed waterways, which empty into suitable outlets.

Filter strips and riparian buffer strips are vegetative plantings of grasses, shrubs, or trees along watercourses. They are designed to trap sediment before it can enter a watercourse. These plantings, commonly used in combination with livestock-exclusion fencing, greatly improve water quality.

Maintaining a protective cover of vegetation on the surface helps to control runoff and increases the rate of water infiltration. Plants and plant roots act as a cushion to absorb the impact of raindrops before they reach the soil. Thus, more water penetrates the surface and less is lost as runoff. A cropping system that keeps crop residue or a plant cover on the surface helps to keep soil losses to a minimum so that the productivity of the soil is maintained. Planting winter cover crops and green manure crops on dairy farms and including grasses or legumes in rotations for forage reduce the hazard of erosion in sloping areas, provide nitrogen for subsequent crops, and improve soil tilth. In 1996, about 9,500 acres was used for rotations of hay or permanent pasture (Gann and Liles, 1999).

Erosion cannot be entirely prevented, but it can be controlled so that it does not diminish the productive capacity of the soil. When practices are designed for a particular field or farm, several factors should be considered. These factors include the type of farming operation, the soil type, the length and steepness of the slopes, the crop rotation, tillage methods, and rainfall patterns. Further information about the design of erosion-control measures is available at the local office of the Natural Resources Conservation Service.

Wind erosion is a hazard on soils that have a sandy surface layer, such as Chelsea, Oakville, Brems, Maumee, Metea, Morocco, Newton, and Denham soils. It is also a concern in areas of soils that have a mucky surface layer, such as Houghton, Edwards, and Adrian soils. More than 70 percent of the county is susceptible to wind erosion, and much of this percentage is cropland. Soils are extremely susceptible to wind erosion in areas where little or no crop residue is left on the surface. Plowing can cover much of the residue. Some crops do not produce large amounts of residue and therefore do not provide protective cover.

Crop damage and soil loss can be severe in fields that have little vegetative cover if the wind is strong and the soil is dry and bare of vegetation or residue. Maintaining a plant cover or keeping the surface rough through proper tillage can minimize the effects of wind erosion. Also, a conservation tillage system that leaves crop residue on the surface helps to control soil blowing on these soils. Field windbreaks also can minimize the effects of soil blowing. On fields where a center-pivot irrigation system is used, low-growing shrubs can be planted as a windbreak. Winter cover crops have also proven effective in controlling wind erosion.

Irrigation makes cultivation practical on droughty soils, such as Brems, Denham, Chelsea, Maumee, Morocco, and Oakville soils, which have a low or moderate available water capacity (fig. 24). Drought can frequently reduce crop yields on these soils. The number of irrigated cropland acres has been steadily increasing in Pulaski County. In 1997, Farm Service Agency records show that approximately 11,000 acres in the county was irrigated. Center-pivot systems are the most popular form of irrigation. Traveling guns and sprinkler systems also are used. Some wells can provide irrigation water at the rate of 2,000 gallons per minute from shallow aquifers with plentiful ground-water supplies. Other sources of irrigation water are ponds, rivers, and ditches. Increased crop yields from irrigation and changes in irrigation equipment have resulted in the use of irrigation for row crops on soils that have slopes of more than 12 percent. Conservation tillage, grassed waterways, and proper

Figure 24.—Soybeans in an area of Oakville-Denham fine sands, 1 to 5 percent slopes. Because these soils are droughty, irrigation is required during the growing season in most years.

management of irrigation water are needed to control runoff, reduce the hazard of erosion, and improve the efficiency of the irrigation system.

Wetness is a limitation on some of the cropland in the county. A drainage system has been installed on more than 120,000 acres in the county, about 100,000 acres of which is cropland. Some soils are naturally so wet that, unless they are drained, production of the crops common to the area is not possible. Some of the poorly drained soils in Pulaski County are Brookston, Gilford, Maumee, Mermill, Milford, Newton, Rensselaer, and Goodell soils. Houghton, Edwards, and Adrian soils are very poorly drained organic soils.

Unless they are artificially drained, the somewhat poorly drained soils in Pulaski County are so wet that crop yields are reduced in most years. Crop damage results from late planting, root damage, and late harvest. Selfridge, Brady, Conover, Crosier, Homer, Morocco, Odell, and Strole soils are somewhat poorly drained. Bronson, Williamstown, Corwin, and Winamac soils are moderately well drained. Natural drainage is adequate in most years in moderately well drained soils, but artificial drainage is needed in some small areas along drainageways and swales.

In most areas of somewhat poorly drained, poorly drained, and very poorly drained soils, a combination of surface drainage and subsurface drainage is needed if the soils are used for intensive row cropping. Random tile drainage is generally adequate for moderately well drained soils. Finding adequate outlets for a tile drainage system is difficult in many areas of Moston, Muskego, and Toto soils. These soils are in depressions and potholes where ponding occurs and where suitable gravity outlets are not readily available. Many areas of these soils cannot be drained economically. Pumping stations can be used in some areas where a gravity outlet is not available (fig. 25). These soils have a low soil temperature and are subject to extended periods of frost, which hinder seed germination and may kill young plants. Drains should be more closely spaced in soils that have slow permeability than in soils that are more permeable. Drainage ditches may need to be deep and may extend a great distance to reach a suitable outlet.

Special management may be needed in areas of organic soils, such as Houghton, Edwards, and Adrian soils. Drainage aerates the soils, and the aeration increases oxidation. As a result, the soils subside. Special systems are needed to control the depth and period of drainage. The water table is lowered during the growing season for crop production and raised to the surface at other times to minimize oxidation and subsidence. Because of variations in the degree of decomposition and in the origin of the parent material, internal water movement may not be uniform. As a result, achieving uniform drainage throughout a field may be difficult. Information regarding proper drainage methods for each type of soil in the county is available at the local office of the Natural Resources Conservation Service. Strict Federal and State regulations apply to certain drainage activities involving wetlands. Draining or filling wetlands is prohibited in most situations. Clearing of wooded wetlands also is prohibited. The local office of the Natural Resources Conservation Service or the U.S. Army Corps of Engineers should be consulted before any work that will affect wetlands is done.

Soil fertility refers to the amount of nutrients available to plants. The natural fertility of soils varies depending on their physical and chemical properties. Most of the soils on uplands and terraces, such as Chelsea, Metea, Miami, and Oakville soils, have low natural fertility because the nutrients have been leached away. The soils in depressions and on bottom land, such as Houghton, Edwards, and Adrian soils, have higher natural fertility because they receive runoff from adjacent soils and have had less nutrient leaching.

Figure 25.—A pump is used to drain areas of such soils as Moston, Muskego, and Toto soils.

The natural fertility of soils can be improved by adding fertilizer or lime or both to increase the available nutrients and raise the pH level of the soil. If crops are continually harvested from the soil and no fertilizer is added, the available nutrients are reduced and the pH is lowered. On all soils, additions of lime and fertilizer, including applications of manure, should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kind and amount of fertilizer and/or lime to be applied.

Soil tilth is an important factor affecting the preparation of a seedbed, the germination of seeds, and the infiltration of water into the soil. Soils that have good tilth are granular and porous. Some of the soils in Pulaski County have a coarse textured surface layer and are porous.

Many of the soils in the survey area have a surface layer of fine sandy loam or loam and have fair or poor tilth. Intense rainfall results in the formation of a crust on the surface of these soils. Once a hard crust forms, the rate of water infiltration is reduced and the runoff rate is increased. Regular additions of crop residue, manure, and other organic material improve tilth and help to prevent the formation of a crust. Excessive tillage tends to compact the soil, breaking down soil structure and tilth, especially when the soils are wet. Applying a system of conservation tillage and tilling only when moisture conditions are favorable minimize the amount of damage resulting from compaction. An adequate drainage system and timely fieldwork help to prevent crusting and minimize compaction.

Fall plowing is generally not a good practice in most areas of the county, especially on sloping soils that are subject to erosion. However, tilth is a problem in areas of the dark, poorly drained Brookston, Rensselaer, and Milford soils and the somewhat poorly drained Conover, Odell, and Strole soils because they commonly stay wet until late spring. If plowed when wet, these soils tend to be very cloddy when they dry. The cloddiness makes preparing a good seedbed difficult. Fall plowing on these soils may result in improved tilth in the spring.

Cropland Limitations and Hazards

The management concerns affecting the use of the soils in the survey area for crops are shown in table 6. The main concerns in managing cropland are controlling water erosion, soil wetness, and ponding; minimizing surface crusting; improving poor tilth; and limiting the effects of excessive or restricted permeability and a limited available water capacity.

Generally, a combination of several practices is needed to control both *water erosion* and *wind erosion*. Conservation tillage, stripcropping, contour farming, conservation cropping systems, crop residue management, diversions, and grassed waterways help to minimize soil loss.

Wetness is a limitation in some areas used for crops, and ponding also is a concern in some areas. Drainage systems consist of subsurface tile drains, surface inlet tile, open drainage ditches, or a combination of these. Measures that maintain the drainage system are needed.

Practices that minimize *surface crusting* and improve *tilth* include incorporating green manure crops, manure, or crop residue into the soil and using a system of conservation tillage. Surface cloddiness can be minimized by avoiding tillage during periods when the soils are too wet.

Measures that conserve moisture are needed in areas where the soils have a *limited available water capacity*. These measures involve reducing the evaporation and runoff rates and increasing the rate of water infiltration. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

Most of the soils in the county, except for some of the soils on flood plains, have a naturally low pH level in the surface layer. Measures that increase the pH level may be needed if crops are to be grown in areas of these soils. Also, soils in which the pH level is high may need treatment so that certain elements are adequately available for crop growth.

Soils in which bedrock is within a depth of 40 inches have a limited rooting depth and a limited available water capacity.

Winter-grown small grain crops are likely to be damaged after flooding events. Water-tolerant species should be selected for planting in areas that are subject to frequent flooding during the growing season.

Some of the considerations shown in the table cannot be easily overcome. These are *flooding, limited rooting depth, restricted permeability,* and *subsidence*.

Following is an explanation of the criteria used in determining the limitations and hazards listed in table 6.

Crusting.—The content of organic matter in the surface layer is less than 2 percent, the percent passing the number 200 sieve is more than 50 percent, and the content of clay is less than 32 percent.

Flooding.—The soil is subject to occasional or frequent flooding during the growing season.

High pH.—The soil has a typical pH value that is equal to or higher than 7.4 in the surface layer.

Limited rooting depth.—Bedrock is within a depth of 40 inches.

Low available water capacity or *moderate available water capacity.*—The available water capacity (weighted average) calculated to a depth of 60 inches or to a root-restricting layer is 0.15 inch or less.

Low pH.—The soil has a typical pH value that is equal to or less than 6.0 in the surface layer.

Ponding.—The soil is subject to ponding during the growing season.

Poor tilth.—The content of clay in the surface layer is 32 percent or more.

Restricted permeability.—Permeability is less than 0.2 inch per hour in one or more layers between the surface and a depth of 40 inches.

Water erosion.—The K factor of the surface layer multiplied by the slope is greater than 0.8, and the slope is 3 percent or more.

Wetness.—The soil has a water table within a depth of 1.5 feet during the growing season.

Wind erosion.—The wind erodibility group is 1 or 2 for soils on flood plains; for other soils, the wind erodibility group is 3.

Pasture and Hayland Management

Forage crops for hay and pasture are suited to the soils and climate of Pulaski County. Alfalfa is the most commonly grown legume in the county. It is well adapted to the climate and well suited to the sloping, well drained soils, such as Metea, Miami, and Ormas soils. It can be grown on the poorly drained soils, such as Brookston and Rensselaer soils, if adequate drainage is available. Other forage crops typically grown in the county are sudangrass, orchardgrass, tall fescue, timothy, smooth bromegrass, and Kentucky bluegrass. Reed canarygrass and tall fescue are grown on poorly drained and very poorly drained soils.

Pasture and hayland are important in Pulaski County because of the large number of cattle, sheep, and horses. Measures that prevent overgrazing help to protect the plant cover and thus reduce the runoff rate and the hazard of erosion. Grazing when the soils are wet results in compaction and poor forage production. Also, allowing grazing in areas of woodland reduces the value of timber that can be sold from a woodlot.

The productivity of a pasture and its ability to protect the soil are influenced by the number of livestock in the pasture, the length of time the animals graze, and the distribution of rainfall. Good pasture management includes proper stocking rates, rotation grazing, and deferred grazing. More information on pasture management is available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

The management concerns affecting the use of the soils in the survey area for pasture are shown in table 7. The major management concerns affecting pasture are water erosion, equipment limitations, wetness and ponding, and a low available water capacity.

The majority of the soils in Pulaski County that are suitable for growing legumes have a high potential for frost action. The local office of the Natural Resources Conservation Service or the Cooperative Extension Service can provide information about legumes subject to damage from frost heave. This hazard is not listed in the table because it applies to the majority of the soils in the survey area.

Growing legumes, cool-season grasses, and warm-season grasses that are suited to the soils and the climate of the area helps to maintain a productive stand of pasture.

Water erosion and wind erosion reduce the productivity of pastureland. Erosion also results in onsite and offsite sedimentation, causes water pollution by sedimentation, and increases the runoff of livestock manure and other added nutrients. Measures that are effective in controlling water erosion include establishing or renovating stands of legumes and grasses. Controlling erosion during seedbed preparation is a major concern. If the soil is tilled for the reseeding of pasture or hay crops, planting winter cover crops, establishing grassed waterways, farming on the contour, and using a system of conservation tillage that leaves a protective cover of crop residue on the surface can help to control erosion.

Overgrazing or grazing when the soil is wet reduces the extent of plant cover and results in surface compaction and poor tilth, and thus it increases the susceptibility to erosion. Proper stocking rates, rotation grazing, and timely deferment of grazing, especially during wet periods, help to keep the pasture in good condition. The proper location of livestock watering facilities helps to prevent surface compaction or the formation of ruts.

In areas where slopes are 15 percent or more, the use of farm equipment may be restricted and may even become hazardous. Also, rock fragments in the surface layer of the soils limit the type of equipment that can be used or can damage equipment during reseeding and planting.

Soils that have bedrock within a depth of 40 inches have a restricted rooting depth and a limited available water capacity.

Available water capacity refers to the capacity of soils to hold water available for use by most plants.

The quality and quantity of the pasture may be reduced in areas of soils that have a low available water capacity and may be inadequate for the maintenance of a healthy community of desired pasture species and, thus, the desired number of livestock. A poor quality pasture may increase the hazard of erosion and increase the runoff of pollutants. Planting drought-resistant species of grasses and legumes helps to establish a cover of vegetation. Irrigation may be needed.

Wetness is a limitation in some areas used for pasture. Ponding also is a concern in some areas. Drainage systems consist of subsurface tile drains, surface inlet tile, open drainage ditches, or a combination of these. Measures that maintain the drainage system are needed.

Low or high pH inhibits the uptake of certain nutrients by the plants or accelerates the absorption of certain other elements to the level of toxic concentrations. Either of these conditions affects the health and vigor of plants. If the pH is low, applications of lime may be needed. The applications should be based on the results of soil tests. The goal is to achieve the optimum pH level for the uptake of the major nutrients by the specific grass, legume, or combination of grasses and legumes.

Some of the limitations and hazards shown in the table cannot be easily overcome. These are *limited rooting depth* and *flooding*.

Following is an explanation of the criteria used in determining the limitations and hazards listed in the table.

Equipment limitation.—The slope is 15 percent or more.

Flooding.—The soil is subject to occasional or frequent flooding during the growing season.

High pH.—The soil has a typical pH value that is equal to or higher than 7.4 in the surface layer.

Limited rooting depth.—Bedrock is within a depth of 40 inches.

Low available water capacity or *moderate available water capacity.*—The available water capacity (weighted average) calculated to a depth of 60 inches is 0.1 inch or less, or it is less than 3 inches in the root zone if the root zone is less than 60 inches thick.

Low pH.—The soil has a typical pH value that is equal to or less than 6.0 in the surface layer.

Ponding.—The soil is subject to ponding during the growing season.

Water erosion.—The K factor multiplied by the slope is greater than 0.8, and the slope is 3 percent or more.

Wetness.—The soil is poorly drained or very poorly drained.

Wind erosion.—The wind erodibility group is 1 or 2 for soils on flood plains; for other soils, the wind erodibility group is 3.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 8. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 8 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forestland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c*, to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, forestland, wildlife habitat, or recreation.

The capability classification of map units in this survey area is given in table 8.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 9. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 5. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Soil Series and Detailed Soil Map Units."

Erosion Factors

Soil erodibility (K) and soil-loss tolerance (T) factors are used in an equation that predicts the amount of soil lost through water erosion in areas of cropland. The procedure for predicting soil loss is useful in guiding the selection of soil and water conservation practices. The erosion factors are shown in table 20.

Soil Erodibility (K) Factor

The soil erodibility (K) factor indicates the susceptibility of a soil to sheet and rill erosion by water. The soil properties that influence erodibility are those that affect the infiltration rate, the movement of water through the soil, and the water storage capacity of the soil and those that allow the soil to resist dispersion, splashing, abrasion, and the transporting forces of rainfall and runoff. The most important soil properties are the content of silt plus very fine sand, the content of sand coarser than very fine sand, the content of organic matter, soil structure, and permeability.

Fragment-Free Soil Erodibility (Kf) Factor

This is one of the factors used in the Revised Universal Soil Loss Equation. It shows the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Soil-Loss Tolerance (T) Factor

The soil-loss tolerance (T) factor is an estimate of the maximum annual rate of soil erosion that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons of soil loss per acre per year. Ratings of 1 to 5 are used, depending on soil properties and prior erosion. The criteria used in assigning a T factor to a soil include maintenance of an adequate rooting depth for crop production, potential reduction of crop yields, maintenance of water-control structures affected by sedimentation, prevention of gullying, and the value of nutrients lost through erosion.

Wind Erodibility Groups

Wind erodibility is directly related to the percentage of dry, nonerodible surface soil aggregates larger than 0.84 millimeter in diameter. From this percentage, the wind erodibility index (I) factor is determined. This factor is an expression of the stability of the soil aggregates, or the extent to which they are broken down by tillage and the abrasion caused by windblown soil particles. Soils are assigned to wind erodibility groups (WEG) having similar percentages of dry soil aggregates larger than 0.84 millimeter. The wind erodibility groups and wind erodibility index factors are listed in table 20.

Additional information about wind erodibility groups and K, Kf, T, and I factors can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 1998) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils.

The indicators used to make onsite determinations of hydric soils in this survey area are specified in “Field Indicators of Hydric Soils in the United States” (Hurt and others, 1998).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Table 10 lists the map units in Pulaski County that meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 1998).

Map units that are made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, yards, fruit trees, gardens, and cropland from wind and snow; help to keep snow on fields; and provide food and cover for wildlife. Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 11 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 11 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Forestland

The tables in this section can help forest owners or managers plan the use of soils for wood crops. They show the potential productivity of the soils for wood crops and rate the soils according to the limitations that affect various aspects of forest management.

Forestland Management and Productivity

In table 12, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Ratings in the column *hazard of off-road or off-trail erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *limitations affecting use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, and ponding. The limitations are described as slight, moderate, and severe. A rating of *slight* indicates that no significant limitations affect the use of harvesting equipment, *moderate* indicates that one or more limitations can cause some difficulty in the use of harvesting equipment, and *severe* indicates that one or more limitations can make the use of harvesting equipment very difficult or even dangerous.

In table 13, interpretive ratings are given for various other aspects of forestland management.

Some rating class terms used in table 13 indicate the degree to which the soils are suited to a specified forest management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management practices. More detailed information about the criteria used in the ratings is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

For *limitations affecting construction of haul roads and log landings*, the ratings are based on slope, flooding, permafrost, plasticity index, the hazard of soil slippage, content of sand, the Unified classification, rock fragments on or below the surface, depth to a restrictive layer that is indurated, depth to a water table, and ponding. The limitations are described as slight, moderate, or severe. A rating of *slight* indicates that no significant limitations affect construction activities, *moderate* indicates that one or more limitations can cause some difficulty in construction, and *severe* indicates that one or more limitations can make construction very difficult or very costly.

The ratings of *suitability for log landings* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to use as log landings.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope (fig. 26). The soils are described as having a low, moderate, or high potential for seedling mortality.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately well suited, or poorly suited to this use.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forest equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Recreation

The soils of the survey area are rated in table 14 according to limitations that affect their suitability for recreation. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specific use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

The ratings in the table are based on restrictive soil

Figure 26.—Tree seedlings in an area of Maumee loamy fine sand, 0 to 1 percent slopes. The potential for seedling mortality is high in areas of this soil because of wetness.

features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of the flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in table 14 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, and sanitary facilities.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Golf fairways and *lawns and landscaping* are affected by many of the same soil features and site characteristics. Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings in this column. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water (fig. 27). Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 15, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible (Allan and others, 1963).

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed

Figure 27.—This area of Morocco loamy fine sand, 0 to 1 percent slopes, provides good habitat for wildlife.

crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are timothy, orchardgrass, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggartick, wildrye, and sedge.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, and hickory.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas (fig. 28). Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Figure 28.—Marsh vegetation in an area of Moston muck, undrained, 0 to 1 percent slopes.

Engineering

This section provides information for planning land uses related to urban development. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, and construction materials. The ratings are based on observed performance of the soils and on the data given in the tables described under the heading “Soil Properties.”

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 16 shows the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, and shallow excavations.

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at a depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to a seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to a water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Sanitary Facilities

Table 17 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of effluent can result in the contamination of ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as a daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

The ratings in the table also apply to the final cover for the landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Table 18 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 18, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

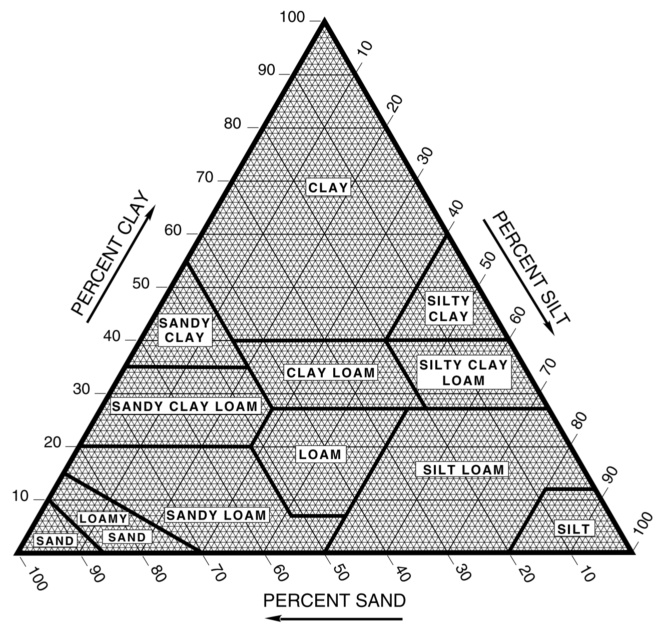


Figure 29.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 19 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 29). “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 20 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In table 20, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In table 20, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 20, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^{1}/_{3}$- or $^{1}/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 20, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 20 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of rock fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 21 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Water Features

Table 22 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 22 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

The *kind* of water table also is indicated. An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 22 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 23 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backlands. The part of a flood plain extending from the base of a valley slope and separated from the river by the natural levee.

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp. An extensive marshy or swampy depressed area on flood plains between natural levees and valley sides or terraces.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has slopes of 0 to 8 percent.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity (CEC). The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from adjacent stands.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Clod. A compact, coherent mass of soil of variable size, typically produced by plowing, digging, or other mechanical means, especially when these activities take place in areas where the soils are too wet or too dry, and normally formed by compression or breaking off from a larger unit.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Even aged. Refers to a stand of trees in which only small differences in age occur between the individuals. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flat. A general term for a level or nearly level surface or small area of land marked by little or no relief.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain step. An essentially flat alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface frequently modified by scour and/or deposition. May occur individually or as a series of steps.

Flow till. Water-saturated till that has flowed slowly downhill from its original place of deposition by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interdune. The relatively flat surface, whether covered with sand or free of sand, between dunes.

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Some methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Major land resource area (MLRA). Geographically associated land resource units made up of nearly homogeneous areas of land use, elevation, topography, climate, water resources, potential natural vegetation, and soils. MLRAs are most useful for statewide agricultural planning and have value for interstate, regional, and national planning. They are designated by numbers and descriptive geographic names.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Paleosol. A soil that formed on a landscape in the past with distinctive morphological features resulting from a soil-forming environment that no longer exists at the site. The former pedogenic process was either altered because of external environmental change or interrupted by burial.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Pararock fragments. Fragments of paralithic materials having a diameter of 2 millimeters or more; for example, parachanners and paraflagstones.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regeneration. The new growth of a natural plant community, developing from seed.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steep area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Scarp. An escarpment, cliff, or steep slope of some extent along the margin of a plateau, mesa, terrace, or structural bench. A scarp may be of any height.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has slopes of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Moderately sloping	6 to 12 percent
Strongly sloping	12 to 18 percent
Moderately steep	18 to 30 percent
Steep	30 to 45 percent
Very steep	45 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil quality. The fitness of a specific kind of soil to function within its surroundings, support plant and animal productivity, maintain or enhance water quality and air quality, and support human health and habitation.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of rock fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A type of stream terrace that formed as an erosional surface cut on bedrock and that is thinly mantled with stream deposits (alluvium).

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structural bench. A platform-like, nearly level to gently inclined erosional surface developed on resistant strata in areas where valleys are cut in alternating strong and weak layers with an essentially horizontal attitude. Structural benches are bedrock controlled and, in contrast to stream terraces, have no geomorphic implication of former partial erosion cycles and base-level controls, nor do they represent a stage of flood-plain development following an episode of valley trenching.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Understory. Any plants in a forest community that grow to a height of less than 5 feet.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Waterspreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Note: The tables in this publication are included for general reference only. They were current as of 1997. The data may have been revised or updated since that date. The most current information for this survey area is available via the Electronic Field Office Technical Guide (eFOTG) National Web site, the NRCS Soil Data Mart Web site, or the NRCS Web Soil Survey.

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Winamac, Indiana)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	31.1	13.7	22.4	57	-19	7	1.83	0.75	2.73	4	7.7
February---	35.6	16.7	26.2	62	-15	16	1.72	.87	2.58	4	7.5
March------	48.5	28.3	38.4	80	2	109	2.78	1.57	3.85	6	3.4
April------	61.9	38.5	50.2	87	18	327	3.68	2.33	4.90	7	1.3
May--------	72.8	49.0	60.9	91	29	649	3.49	2.12	4.73	6	.0
June-------	81.1	58.2	69.7	95	40	890	4.17	3.00	5.26	7	.0
July-------	83.8	62.0	72.9	96	45	1,019	3.87	1.93	5.55	6	.0
August-----	81.4	59.9	70.7	94	42	943	3.86	1.96	5.51	6	.0
September--	75.1	53.2	64.2	91	33	713	3.29	1.21	5.02	6	.0
October----	63.6	41.7	52.7	84	23	397	2.72	1.50	3.80	5	.1
November---	49.9	31.8	40.8	74	11	130	3.05	1.69	4.25	6	2.5
December---	36.0	20.1	28.0	63	-11	22	2.94	1.32	4.33	6	6.7
Yearly:											
Average---	60.1	39.4	49.7	---	---	---	---	---	---	---	---
Extreme---	102	-29	---	98	-21	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,222	37.39	33.01	41.41	69	29.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Winamac, Indiana)

Probability	Temperature 24 ^{o}F or lower	28 ^{o}F or lower	32 ^{o}F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 21	May 4	May 21
2 years in 10 later than--	Apr. 16	Apr. 28	May 14
5 years in 10 later than--	Apr. 6	Apr. 18	May 2
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 21	Oct. 4	Sept. 26
2 years in 10 earlier than--	Oct. 26	Oct. 10	Oct. 1
5 years in 10 earlier than--	Nov. 5	Oct. 22	Oct. 10

Table 3.--Growing Season

(Recorded in the period 1961-90 at Winamac, Indiana)

Probability	Daily minimum temperature during growing season: Higher than 24 ^{o}F	Higher than 28 ^{o}F	Higher than 32 ^{o}F
	Days	Days	Days
9 years in 10	190	163	139
8 years in 10	197	171	147
5 years in 10	211	186	160
2 years in 10	226	201	174
1 year in 10	233	209	181

Table 4.--Classification of the Soils

Soil name	Family or higher taxonomic class
Abscota	Mixed, mesic Oxyaquic Udipsamments
Ackerman	Sandy, mixed, mesic Histic Humaquepts
Adrian	Sandy or sandy-skeletal, mixed, euic, mesic Terric Haplosaprists
Antung	Sandy, mixed, mesic Histic Humaquepts
Brady	Coarse-loamy, mixed, active, mesic Aquollic Hapludalfs
Brems	Mixed, mesic Aquic Udipsamments
Bronson	Coarse-loamy, mixed, active, mesic Aquic Hapludalfs
Brookston	Fine-loamy, mixed, superactive, mesic Typic Argiaquolls
Budd	Coarse-loamy, mixed, active, mesic Aquollic Hapludalfs
Chelsea	Mixed, mesic Lamellic Udipsamments
Cohoctah	Coarse-loamy, mixed, active, mesic Fluvaquentic Endoaquolls
Conover	Fine-loamy, mixed, active, mesic Udollic Endoaqualfs
Corwin	Fine-loamy, mixed, active, mesic Oxyaquic Argiudolls
Crosier	Fine-loamy, mixed, active, mesic Aeric Epiaqualfs
Denham	Mixed, mesic Oxyaquic Udipsamments
Edselton	Marly, euic, mesic Limnic Haplosaprists
Edwards	Marly, euic, mesic Limnic Haplosaprists
Francesville	Fine-loamy, mixed, superactive, mesic Aquic Argiudolls
Gilford	Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls
Goodell	Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls
Granby	Sandy, mixed, mesic Typic Endoaquolls
Gumz	Sandy, mixed, mesic Typic Endoaquolls
Headlee	Fine-loamy, mixed, active, mesic Udollic Epiaqualfs
Homer	Fine-loamy over sandy or sandy-skeletal, mixed, active, mesic Aeric Endoaqualfs
Houghton	Euic, mesic Typic Haplosaprists
Madaus	Coarse-silty over sandy or sandy-skeletal, carbonatic over mixed, mesic Histic Humaquepts
Maumee	Sandy, mixed, mesic Typic Endoaquolls
Medaryville	Sandy over loamy, mixed, semiactive, mesic Aquic Argiudolls
Mermill	Fine-loamy, mixed, active, mesic Mollic Epiaqualfs
Metea	Loamy, mixed, active, mesic Arenic Hapludalfs
Miami	Fine-loamy, mixed, active, mesic Oxyaquic Hapludalfs
Milford	Fine, mixed, superactive, mesic Typic Endoaquolls
Monon	Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls
Moon	Fine-loamy, mixed, active, mesic Oxyaquic Hapludalfs
Morocco	Mixed, mesic Aquic Udipsamments
Moston	Coprogenous, euic, mesic Limnic Haplosaprists
Muskego	Coprogenous, euic, mesic Limnic Haplosaprists
Navunon	Fine-loamy, mixed, superactive, mesic Typic Argiaquolls
Newton	Sandy, mixed, mesic Typic Humaquepts
Oakville	Mixed, mesic Typic Udipsamments
Odell	Fine-loamy, mixed, superactive, mesic Aquic Argiudolls
Ormas	Loamy, mixed, active, mesic Arenic Hapludalfs
Radioville	Fine-loamy, mixed, superactive, mesic Typic Argiaquolls
Rensselaer	Fine-loamy, mixed, superactive, mesic Typic Argiaquolls
Riddles	Fine-loamy, mixed, active, mesic Typic Hapludalfs
Sebewa	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Argiaquolls
Selfridge	Loamy, mixed, active, mesic Aquic Arenic Hapludalfs
Sloan	Fine-loamy, mixed, superactive, mesic Fluvaquentic Endoaquolls
Southwest	Fine-silty, mixed, superactive, nonacid, mesic Typic Fluvaquents
Strole	Fine, illitic, mesic Aquic Argiudolls
Sumava	Coarse-loamy, mixed, active, mesic Aquic Argiudolls
Toto	Coprogenous, euic, mesic Limnic Haplosaprists
Udorthents	Udorthents
Whiskerville	Coarse-loamy, mixed, active, mesic Aquollic Hapludalfs
Whitepost	Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls
Williamstown	Fine-loamy, mixed, active, mesic Aquic Hapludalfs
Winamac	Coarse-loamy, mixed, active, mesic Aquollic Hapludalfs
Wunabuna	Fine, mixed, superactive, nonacid, mesic Fluvaquentic Endoaquepts

Table 5.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AadAK	Abscota fine sandy loam, 0 to 2 percent slopes, occasionally flooded, brief duration	817	0.3
AatAN	Ackerman muck, drained, 0 to 1 percent slopes	497	0.2
AatAU	Ackerman muck, undrained, 0 to 1 percent slopes	199	*
AbhAN	Adrian muck, drained, 0 to 1 percent slopes	2,982	1.1
AbhAU	Adrian muck, undrained, 0 to 1 percent slopes	994	0.4
ApuAN	Antung muck, drained, 0 to 1 percent slopes	1,988	0.7
ApuAU	Antung muck, undrained, 0 to 1 percent slopes	298	0.1
BrvA	Brady fine sandy loam, 0 to 1 percent slopes	1,193	0.4
BstA	Brems loamy fine sand, 0 to 1 percent slopes	2,485	0.9
BstB	Brems loamy fine sand, 1 to 4 percent slopes	6,461	2.3
BswA	Brems-Morocco loamy fine sands, 0 to 1 percent slopes	15,904	5.7
BupB	Bronson fine sandy loam, 1 to 4 percent slopes	199	*
BuuA	Brookston loam, 0 to 1 percent slopes	21,868	7.9
BuzA	Brookston-Navunon loams, 0 to 1 percent slopes	8,449	3.0
BwfA	Budd-Brady fine sandy loams, 0 to 1 percent slopes	2,485	0.9
CjfC	Chelsea fine sand, 5 to 12 percent slopes	1,392	0.5
CjfD	Chelsea fine sand, 12 to 18 percent slopes	199	*
CmbAI	Cohoctah loam, 0 to 1 percent slopes, frequently flooded, brief duration	795	0.3
CnzAI	Cohoctah-Abscota complex, 0 to 1 percent slopes, frequently flooded, brief duration	746	0.3
CpcA	Conover loam, 0 to 1 percent slopes	2,584	0.9
CqmA	Corwin fine sandy loam, 0 to 1 percent slopes	3,479	1.3
CuyA	Crosier fine sandy loam, 0 to 1 percent slopes	7,455	2.7
DbsA	Denham fine sand, 0 to 1 percent slopes	2,985	1.1
DbsB	Denham fine sand, 1 to 5 percent slopes	497	0.2
EchAN	Edwards muck, drained, 0 to 1 percent slopes	398	0.1
EchAU	Edwards muck, undrained, 0 to 1 percent slopes	199	*
EcrAN	Edselton muck, drained, 0 to 1 percent slopes	497	0.2
EcrAU	Edselton muck, undrained, 0 to 1 percent slopes	199	*
GcwA	Gilford fine sandy loam, 0 to 1 percent slopes	1,988	0.7
GdvA	Gilford-Monon fine sandy loams, 0 to 1 percent slopes	199	*
GmnA	Goodell-Gilford fine sandy loams, 0 to 1 percent slopes	3,980	1.4
GrfA	Granby loamy fine sand, 0 to 1 percent slopes	1,988	0.7
GsaA	Granby-Gilford complex, 0 to 1 percent slopes	1,988	0.7
HbzA	Headlee-Brady fine sandy loams, 0 to 1 percent slopes	3,480	1.3
HnbA	Homer sandy loam, 0 to 1 percent slopes	199	*
HtbAN	Houghton muck, drained, 0 to 1 percent slopes	3,976	1.4
HtbAU	Houghton muck, undrained, 0 to 1 percent slopes	1,495	0.5
MfrAN	Madaus muck, drained, 0 to 1 percent slopes	398	0.1
MfrAU	Madaus muck, undrained, 0 to 1 percent slopes	199	*
MgyA	Maumee-Gilford complex, 0 to 1 percent slopes	9,940	3.6
MgzA	Maumee-Gumz complex, 0 to 1 percent slopes	4,970	1.8
MhaA	Maumee loamy fine sand, 0 to 1 percent slopes	44,730	16.1
MhbA	Maumee mucky loamy fine sand, 0 to 1 percent slopes	1,295	0.5
MhnA	Medaryville fine sandy loam, 0 to 1 percent slopes	994	0.4
MlwB	Metea-Moon loamy sands, 1 to 5 percent slopes	4,475	1.6
MmyC2	Miami fine sandy loam, 5 to 10 percent slopes, moderately eroded	273	*
MnzB	Miami-Williamstown fine sandy loams, 2 to 5 percent slopes	2,310	0.8
MouA	Milford silty clay loam, 0 to 1 percent slopes	1,547	0.6
MtoA	Moon-Ormas loamy sands, 0 to 1 percent slopes	2,090	0.8
MtoB	Moon-Ormas loamy sands, 1 to 5 percent slopes	1,590	0.6
MtpA	Moon-Selfridge complex, 0 to 1 percent slopes	2,390	0.9
MupA	Morocco loamy fine sand, 0 to 1 percent slopes	9,445	3.4
MvhAN	Moston muck, drained, 0 to 1 percent slopes	398	0.1
MvhAU	Moston muck, undrained, 0 to 1 percent slopes	398	0.1
MwzAN	Muskego muck, drained, 0 to 1 percent slopes	199	*
MwzAU	Muskego muck, undrained, 0 to 1 percent slopes	199	*
NofA	Newton-Morocco loamy fine sands, 0 to 1 percent slopes	7,955	2.9
OacA	Oakville-Denham fine sands, 0 to 1 percent slopes	298	0.1
OacB	Oakville-Denham fine sands, 1 to 5 percent slopes	21,100	7.6
OaeC	Oakville fine sand, 5 to 12 percent slopes	8,650	3.1
OaeD	Oakville fine sand, 12 to 18 percent slopes	1,275	0.5

See footnote at end of table.

Table 5.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
OeaA	Odell fine sandy loam, 0 to 1 percent slopes	99	*
OecA	Odell-Francesville fine sandy loams, 0 to 1 percent slopes	5,470	2.0
Pmg	Pits, gravel	50	*
Pps	Pits, quarries, limestone	398	0.1
RebA	Radioville-Mermill loams, 0 to 1 percent slopes	547	0.2
RevA	Rensselaer-Radioville loams, 0 to 1 percent slopes	5,470	2.0
ReyA	Rensselaer loam, 0 to 1 percent slopes	2,985	1.1
RhcA	Riddles fine sandy loam, 0 to 2 percent slopes	2,985	1.1
ScuA	Sebewa loam, 0 to 1 percent slopes	1,790	0.6
SdzcB	Selfridge-Brems loamy fine sands, 1 to 4 percent slopes	1,495	0.5
SgzA	Selfridge loamy fine sand, 0 to 1 percent slopes	994	0.4
ShaA	Selfridge-Morocco loamy fine sands, 0 to 1 percent slopes	249	*
SmsAK	Sloan silt loam, 0 to 1 percent slopes, occasionally flooded, brief duration	99	*
SnlA	Southwest silt loam, 0 to 1 percent slopes	298	0.1
SwiA	Strole silt loam, 0 to 1 percent slopes	2,485	0.9
SwxA	Sumava fine sandy loam, 0 to 1 percent slopes	99	*
TmaAN	Toto muck, drained, 0 to 1 percent slopes	995	0.4
TmaAU	Toto muck, undrained, 0 to 1 percent slopes	199	*
UbrA	Udorthents, clayey, 0 to 1 percent slopes	30	*
W	Water	1,049	0.4
WmgA	Whiskerville-Bronson fine sandy loams, 0 to 1 percent slopes	1,789	0.6
WmiA	Whitepost-Gilford fine sandy loams, 0 to 1 percent slopes	4,475	1.6
WoeB	Williamstown-Crosier fine sandy loams, 1 to 5 percent slopes	2,290	0.8
WogA	Williamstown fine sandy loam, 0 to 2 percent slopes	2,990	1.1
WoxA	Williamstown-Winamac fine sandy loams, 0 to 1 percent slopes	596	0.2
WoxB	Williamstown-Winamac fine sandy loams, 1 to 5 percent slopes	348	0.1
WpaA	Winamac-Bronson fine sandy loams, 0 to 1 percent slopes	2,286	0.8
WpbA	Winamac fine sandy loam, 0 to 1 percent slopes	547	0.2
WpbB	Winamac fine sandy loam, 1 to 5 percent slopes	50	*
WrxAN	Wunabuna silt loam, drained, 0 to 1 percent slopes	298	0.1
	Total	278,110	100.0

* Less than 0.1 percent.

Table 6.--Main Limitations and Hazards Affecting Cropland

(See text for definitions of and criteria for the limitations and hazards listed in this table.)

Map symbol and soil name	Limitations and hazards
AadAK:	
Abscota	Flooding, wetness, wind erosion, low available water capacity
AatAN:	
Ackerman	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
AatAU:	
Ackerman	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
AbhAN:	
Adrian	Ponding, low pH, wind erosion
AbhAU:	
Adrian	Ponding, low pH, wind erosion
ApuAN:	
Antung	Ponding, low pH, wind erosion, moderate available water capacity to a depth of 60 inches
ApuAU:	
Antung	Ponding, low pH, wind erosion, moderate available water capacity to a depth of 60 inches
BrvA:	
Brady	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
BstA:	
Brems	Wind erosion, low available water capacity, excessive permeability
BstB:	
Brems	Water erosion, wind erosion, low available water capacity, excessive permeability
BswA:	
Brems	Wind erosion, low available water capacity, excessive permeability
Morocco	Wetness, low pH, wind erosion, low available water capacity, excessive permeability
BupB:	
Bronson	Wetness, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
BuuA:	
Brookston	Ponding
BuzA:	
Brookston	Ponding
Navunon	Ponding, depth to bedrock, moderate available water capacity to a depth of 60 inches
BwfA:	
Budd	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches

Table 6.--Main Limitations and Hazards Affecting Cropland--Continued

Map symbol and soil name	Limitations and hazards
BwfA:	
Brady	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
CjfC:	
Chelsea	Water erosion, wind erosion, low available water capacity, excessive permeability
CjfD:	
Chelsea	Slope, water erosion, wind erosion, low available water capacity, excessive permeability
CmbAI:	
Cohoctah	Flooding, wetness
CnzAI:	
Cohoctah	Flooding, wetness
Abscota	Flooding, wetness, wind erosion, low available water capacity
CpcA:	
Conover	Wetness, low available water capacity
CqmA:	
Corwin	Wetness, root-restricting layer, low pH, wind erosion, low available water capacity
CuyA:	
Crosier	Wetness, root-restricting layer, wind erosion, low available water capacity
DbsA:	
Denham	Low pH, wind erosion, low available water capacity, excessive permeability
DbsB:	
Denham	Low pH, water erosion, wind erosion, low available water capacity, excessive permeability
EchAN:	
Edwards	Ponding, low pH, wind erosion
EchAU:	
Edwards	Ponding, low pH, wind erosion
EcrAN:	
Edselton	Ponding, wind erosion
EcrAU:	
Edselton	Ponding, wind erosion
GcwA:	
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
GdvA:	
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
Monon	Ponding, depth to bedrock, wind erosion, moderate available water capacity to a depth of 60 inches

Table 6.--Main Limitations and Hazards Affecting Cropland--Continued

Map symbol and soil name	Limitations and hazards
GmnA:	
Goodell	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
GrfA:	
Granby	Ponding, wind erosion, low available water capacity, excessive permeability
GsaA:	
Granby	Ponding, wind erosion, low available water capacity, excessive permeability
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
HbzA:	
Headlee	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
Brady	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
HnbA:	
Homer	Wetness, low pH, wind erosion, low available water capacity
HtbAN:	
Houghton	Ponding, low pH, wind erosion
HtbAU:	
Houghton	Ponding, wind erosion
MfrAN:	
Madaus	Ponding, low pH, wind erosion, low available water capacity
MfrAU:	
Madaus	Ponding, low pH, wind erosion, low available water capacity
MgyA:	
Maumee	Ponding, wind erosion, low available water capacity, excessive permeability
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
MgzA:	
Maumee	Ponding, wind erosion, low available water capacity, excessive permeability
Gumz	Ponding, wind erosion, low available water capacity, excessive permeability
MhaA:	
Maumee	Ponding, wind erosion, low available water capacity, excessive permeability
MhbA:	
Maumee	Ponding, wind erosion, low available water capacity, excessive permeability
MhnA:	
Medaryville	Ponding, high pH, wind erosion, moderate available water capacity to a depth of 60 inches

Table 6.--Main Limitations and Hazards Affecting Cropland--Continued

Map symbol and soil name	Limitations and hazards
MlwB:	
Metea	Low pH, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches, excessive permeability
Moon	Wetness, low pH, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches, excessive permeability
MmyC2:	
Miami	Part of the surface layer removed by erosion, root-restricting layer, low pH, water erosion, wind erosion, low available water capacity
MnzB:	
Miami	Root-restricting layer, low pH, water erosion, wind erosion, low available water capacity
Williamstown	Wetness, root-restricting layer, low pH, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
MouA:	
Milford	Ponding
MtoA:	
Moon	Wetness, low pH, wind erosion, moderate available water capacity to a depth of 60 inches, excessive permeability
Ormas	Wind erosion, low available water capacity, excessive permeability
MtoB:	
Moon	Wetness, low pH, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches, excessive permeability
Ormas	Water erosion, wind erosion, low available water capacity, excessive permeability
MtpA:	
Moon	Wetness, low pH, wind erosion, moderate available water capacity to a depth of 60 inches, excessive permeability
Selfridge	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
MupA:	
Morocco	Wetness, low pH, wind erosion, low available water capacity, excessive permeability
MvhAN:	
Moston	Ponding, low pH, wind erosion
MvhAU:	
Moston	Ponding, low pH, wind erosion
MwzAN:	
Muskego	Ponding, low pH, wind erosion
MwzAU:	
Muskego	Ponding, low pH, wind erosion

Table 6.--Main Limitations and Hazards Affecting Cropland--Continued

Map symbol and soil name	Limitations and hazards
NofA:	
Newton	Ponding, low pH, wind erosion, low available water capacity, excessive permeability
Morocco	Wetness, low pH, wind erosion, low available water capacity, excessive permeability
OacA:	
Oakville	Low pH, wind erosion, low available water capacity, excessive permeability
Denham	Low pH, wind erosion, low available water capacity, excessive permeability
OacB:	
Oakville	Low pH, water erosion, wind erosion, low available water capacity, excessive permeability
Denham	Low pH, water erosion, wind erosion, low available water capacity, excessive permeability
OaeC:	
Oakville	Low pH, water erosion, wind erosion, low available water capacity, excessive permeability
OaeD:	
Oakville	Slope, low pH, water erosion, wind erosion, low available water capacity, excessive permeability
OeaA:	
Odell	Wetness, root-restricting layer, low available water capacity
OecA:	
Odell	Wetness, root-restricting layer, low available water capacity
Francesville	Wetness, root-restricting layer, low available water capacity
Pmg:	
Pits, gravel	Slope, very gravelly surface
Pps:	
Pits, quarries, limestone	Very low available water capacity
RebA:	
Radioville	Ponding
Mermill	Ponding
RevA:	
Rensselaer	Ponding
Radioville	Ponding
ReyA:	
Rensselaer	Ponding
RhcA:	
Riddles	Low pH, wind erosion
ScuA:	
Sebewa	Ponding, moderate available water capacity to a depth of 60 inches

Table 6.--Main Limitations and Hazards Affecting Cropland--Continued

Map symbol and soil name	Limitations and hazards
SdzcB:	
Selfridge	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
Brems	Water erosion, wind erosion, low available water capacity, excessive permeability
SgzA:	
Selfridge	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
ShaA:	
Selfridge	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
Morocco	Wetness, low pH, wind erosion, low available water capacity, excessive permeability
SmsAK:	
Sloan	Flooding, ponding
SnlA:	
Southwest	Ponding, crusting
SwiA:	
Strole	Wetness, moderate available water capacity to a depth of 60 inches
SwxA:	
Sumava	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
TmaAN:	
Toto	Ponding, low pH, wind erosion
TmaAU:	
Toto	Ponding, low pH, wind erosion
UbrA:	
Udorthents, clayey	Poor tilth, low available water capacity
W:	
Water.	
WmgA:	
Whiskerville	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
Bronson	Wetness, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
WmiA:	
Whitepost	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
WoeB:	
Williamstown	Wetness, root-restricting layer, low pH, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
Crosier	Wetness, root-restricting layer, water erosion, wind erosion, low available water capacity

Table 6.--Main Limitations and Hazards Affecting Cropland--Continued

Map symbol and soil name	Limitations and hazards
WogA:	
Williamstown	Wetness, root-restricting layer, low pH, wind erosion, moderate available water capacity to a depth of 60 inches
WoxA:	
Williamstown	Wetness, root-restricting layer, low pH, wind erosion, moderate available water capacity to a depth of 60 inches
Winamac	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
WoxB:	
Williamstown	Wetness, root-restricting layer, low pH, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
Winamac	Wetness, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
WpaA:	
Winamac	Wetness, wind erosion, moderate available water capacity to a depth of 60 inches
Bronson	Wetness, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
WpbA:	
Winamac	Wetness, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
WpbB:	
Winamac	Wetness, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
WrxAN:	
Wunabuna	Ponding

Table 7.--Main Limitations and Hazards Affecting Pasture

(See text for definitions of and criteria for the limitations and hazards listed in this table.)

Map symbol and soil name	Limitations and hazards
AadAK:	
Abscota	Flooding, wind erosion, low available water capacity
AatAN:	
Ackerman	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
AatAU:	
Ackerman	Ponding, wetness, wind erosion, moderate available water capacity to a depth of 60 inches
AbhAN:	
Adrian	Ponding, wind erosion
AbhAU:	
Adrian	Ponding, wetness, wind erosion
ApuAN:	
Antung	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
ApuAU:	
Antung	Ponding, wetness, wind erosion, moderate available water capacity to a depth of 60 inches
BrvA:	
Brady	Wind erosion, moderate available water capacity to a depth of 60 inches
BstA:	
Brems	Wind erosion, low available water capacity
BstB:	
Brems	Water erosion, wind erosion, low available water capacity
BswA:	
Brems	Wind erosion, low available water capacity
Morocco	Wind erosion, low available water capacity
BupB:	
Bronson	Water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
BuuA:	
Brookston	Ponding
BuzA:	
Brookston	Ponding
Navunon	Ponding, depth to bedrock, moderate available water capacity to a depth of 60 inches
BwfA:	
Budd	Wind erosion, moderate available water capacity to a depth of 60 inches
Brady	Wind erosion, moderate available water capacity to a depth of 60 inches

Table 7.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Limitations and hazards
CjfC:	
Chelsea	Water erosion, wind erosion, low available water capacity
CjfD:	
Chelsea	Equipment limitation, water erosion, wind erosion, low available water capacity
CmbAI:	
Cohoctah	Flooding
CnzAI:	
Cohoctah	Flooding
Abscota	Flooding, wind erosion, low available water capacity
CpcA:	
Conover	Low available water capacity
CqmA:	
Corwin	Root-restricting layer, wind erosion, low available water capacity
CuyA:	
Crosier	Root-restricting layer, wind erosion, low available water capacity
DbsA:	
Denham	Wind erosion, low available water capacity
DbsB:	
Denham	Water erosion, wind erosion, low available water capacity
EchAN:	
Edwards	Ponding, wind erosion
EchAU:	
Edwards	Ponding, wetness, wind erosion
EcrAN:	
Edselton	Ponding, wind erosion
EcrAU:	
Edselton	Ponding, wetness, wind erosion
GcwA:	
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
GdvA:	
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
Monon	Ponding, depth to bedrock, wind erosion, moderate available water capacity to a depth of 60 inches
GmnA:	
Goodell	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
GrfA:	
Granby	Ponding, wind erosion, low available water capacity

Table 7.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Limitations and hazards
GsaA:	
Granby	Ponding, wind erosion, low available water capacity
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
HbzA:	
Headlee	Wind erosion, moderate available water capacity to a depth of 60 inches
Brady	Wind erosion, moderate available water capacity to a depth of 60 inches
HnbA:	
Homer	Wind erosion, low available water capacity
HtbAN:	
Houghton	Ponding, wind erosion
HtbAU:	
Houghton	Ponding, wetness, wind erosion
MfrAN:	
Madaus	Ponding, wind erosion, low available water capacity
MfrAU:	
Madaus	Ponding, wetness, wind erosion, low available water capacity
MgyA:	
Maumee	Ponding, wind erosion, low available water capacity
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
MgzA:	
Maumee	Ponding, wind erosion, low available water capacity
Gumz	Ponding, wind erosion, low available water capacity
MhaA:	
Maumee	Ponding, wind erosion, low available water capacity
MhbA:	
Maumee	Ponding, wind erosion, low available water capacity
MhnA:	
Medaryville	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
MlwB:	
Metea	Water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
Moon	Water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
MmyC2:	
Miami	Root-restricting layer, water erosion, wind erosion, low available water capacity

Table 7.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Limitations and hazards
MnzB:	
Miami	Root-restricting layer, water erosion, wind erosion, low available water capacity
Williamstown	Root-restricting layer, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
MouA:	
Milford	Ponding
MtoA:	
Moon	Wind erosion, moderate available water capacity to a depth of 60 inches
Ormas	Wind erosion, low available water capacity
MtoB:	
Moon	Water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
Ormas	Water erosion, wind erosion, low available water capacity
MtpA:	
Moon	Wind erosion, moderate available water capacity to a depth of 60 inches
Selfridge	Wind erosion, moderate available water capacity to a depth of 60 inches
MupA:	
Morocco	Wind erosion, low available water capacity
MvhAN:	
Moston	Ponding, wind erosion
MvhAU:	
Moston	Ponding, wetness, wind erosion
MwzAN:	
Muskego	Ponding, wind erosion
MwzAU:	
Muskego	Ponding, wetness, wind erosion
NofA:	
Newton	Ponding, wind erosion, low available water capacity
Morocco	Wind erosion, low available water capacity
OacA:	
Oakville	Low pH, wind erosion, low available water capacity
Denham	Wind erosion, low available water capacity
OacB:	
Oakville	Low pH, water erosion, wind erosion, low available water capacity
Denham	Water erosion, wind erosion, low available water capacity
OaeC:	
Oakville	Low pH, water erosion, wind erosion, low available water capacity

Table 7.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Limitations and hazards
OaeD:	
Oakville	Equipment limitation, low pH, water erosion, wind erosion, low available water capacity
OeaA:	
Odell	Root-restricting layer, low available water capacity
OecA:	
Odell	Root-restricting layer, low available water capacity
Francesville	Depth to bedrock, root-restricting layer, low available water capacity
Pmg:	
Pits, gravel	Equipment limitation, very gravelly surface
Pps:	
Pits, quarries, limestone	Very low available water capacity
RebA:	
Radioville	Ponding
Mermill	Ponding
RevA:	
Rensselaer	Ponding
Radioville	Ponding
ReyA:	
Rensselaer	Ponding
RhcA:	
Riddles	Wind erosion
ScuA:	
Sebewa	Ponding, moderate available water capacity to a depth of 60 inches
SdzcB:	
Selfridge	Wind erosion, moderate available water capacity to a depth of 60 inches
Brems	Water erosion, wind erosion, low available water capacity
SgzA:	
Selfridge	Wind erosion, moderate available water capacity to a depth of 60 inches
ShaA:	
Selfridge	Wind erosion, moderate available water capacity to a depth of 60 inches
Morocco	Wind erosion, low available water capacity
SmsAK:	
Sloan	Flooding, ponding
SnlA:	
Southwest	Ponding
SwiA:	
Strole	Moderate available water capacity to a depth of 60 inches

Table 7.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Limitations and hazards
SwxA:	
Sumava	Wind erosion, moderate available water capacity to a depth of 60 inches
TmaAN:	
Toto	Ponding, wind erosion
TmaAU:	
Toto	Ponding, wind erosion
UbrA:	
Udorthents, clayey	Low available water capacity
W:	
Water.	
WmgA:	
Whiskerville	Wind erosion, moderate available water capacity to a depth of 60 inches
Bronson	Wind erosion, moderate available water capacity to a depth of 60 inches
WmiA:	
Whitepost	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
Gilford	Ponding, wind erosion, moderate available water capacity to a depth of 60 inches
WoeB:	
Williamstown	Root-restricting layer, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
Crosier	Root-restricting layer, water erosion, wind erosion, low available water capacity
WogA:	
Williamstown	Root-restricting layer, wind erosion, moderate available water capacity to a depth of 60 inches
WoxA:	
Williamstown	Root-restricting layer, wind erosion, moderate available water capacity to a depth of 60 inches
Winamac	Wind erosion, moderate available water capacity to a depth of 60 inches
WoxB:	
Williamstown	Root-restricting layer, water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
Winamac	Water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
WpaA:	
Winamac	Wind erosion, moderate available water capacity to a depth of 60 inches
Bronson	Wind erosion, moderate available water capacity to a depth of 60 inches
WpbA:	
Winamac	Wind erosion, moderate available water capacity to a depth of 60 inches

Table 7.--Main Limitations and Hazards Affecting Pasture--Continued

Map symbol and soil name	Limitations and hazards
WpbB:	
Winamac	Water erosion, wind erosion, moderate available water capacity to a depth of 60 inches
WrxAN:	
Wunabuna	Ponding

Table 8.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Pasture	Soybeans	Winter wheat
		Bu	Tons	AUM*	Bu	Bu
AadAK:						
Abscota	4s	75	2.5	5.0	26	34
AatAN:						
Ackerman, drained	4w	90	3.0	6.0	32	36
AatAU:						
Ackerman, undrained	5w	---	---	---	---	---
AbhAN:						
Adrian, drained	3w	120	4.0	8.0	42	48
AbhAU:						
Adrian, undrained	5w	---	---	---	---	---
ApuAN:						
Antung, drained	3w	100	3.3	6.6	35	45
ApuAU:						
Antung, undrained	5w	---	---	---	---	---
BrvA:						
Brady	2w	100	3.3	6.6	35	40
BstA:						
Brems	4s	60	2.0	4.0	21	27
BstB:						
Brems	4s	60	2.0	4.0	21	27
BswA:						
Brems	4s	60	2.0	4.0	21	27
Morocco	4s	70	2.3	4.6	25	32
BupB:						
Bronson	2e	90	3.0	6.0	32	36
BuuA:						
Brookston	2w	145	4.8	9.6	51	65
BuzA:						
Brookston	2w	145	4.8	9.6	51	65
Navunon	2w	135	4.5	9.0	47	61
BwfA:						
Budd	2w	100	3.3	6.6	35	40
Brady	2w	100	3.3	6.6	35	40
CjfC:						
Chelsea	6e	45	1.5	3.0	16	20

See footnote at end of table.

Table 8.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Pasture	Soybeans	Winter wheat
		Bu	Tons	AUM*	Bu	Bu
CjfD:						
Chelsea-------------	6e	30	1.0	2.0	12	11
CmbAI:						
Cohoctah------------	4w	---	---	---	---	---
CnzAI:						
Cohoctah------------	4w	---	---	---	---	---
Abscota-------------	4s	75	2.5	5.0	26	34
CpcA:						
Conover-------------	2w	125	4.1	8.2	44	56
CqmA:						
Corwin--------------	1	115	3.8	7.6	40	52
CuyA:						
Crosier-------------	2w	115	3.8	7.6	40	52
DbsA:						
Denham--------------	4s	60	2.0	4.0	21	27
DbsB:						
Denham--------------	4s	60	2.0	4.0	21	27
EchAN:						
Edwards, drained----	4w	110	3.6	7.2	39	44
EchAU:						
Edwards, undrained--	5w	---	---	---	---	---
EcrAN:						
Edselton, drained---	4w	110	3.6	7.2	39	44
EcrAU:						
Edselton, undrained	5w	---	---	---	---	---
GcwA:						
Gilford-------------	2w	120	4.0	8.0	42	48
GdvA:						
Gilford-------------	2w	120	4.0	8.0	42	48
Monon---------------	2w	110	3.6	7.2	39	44
GmnA:						
Goodell-------------	2w	120	4.0	8.0	42	48
Gilford-------------	2w	120	4.0	8.0	42	48
GrfA:						
Granby--------------	4w	100	3.3	6.6	35	45
GsaA:						
Granby--------------	4w	100	3.3	6.6	35	45
Gilford-------------	2w	120	4.0	8.0	42	48

See footnote at end of table.

Table 8.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Pasture	Soybeans	Winter wheat
		Bu	Tons	AUM*	Bu	Bu
HbzA:						
Headlee	2w	125	4.1	8.2	44	50
Brady	2w	100	3.3	6.6	35	40
HnbA:						
Homer	2w	95	3.1	6.2	33	48
HtbAN:						
Houghton, drained	3w	130	4.3	8.6	46	52
HtbAU:						
Houghton, undrained	5w	---	---	---	---	---
MfrAN:						
Madaus, drained	4w	90	3.0	6.0	32	36
MfrAU:						
Madaus, undrained	5w	---	---	---	---	---
MgyA:						
Maumee	3w	100	3.3	6.6	35	45
Gilford	2w	120	4.0	8.0	42	48
MgzA:						
Maumee	3w	100	3.3	6.6	35	45
Gumz	3w	100	3.3	6.6	35	45
MhaA:						
Maumee	3w	100	3.3	6.6	35	45
MhbA:						
Maumee	3w	100	3.3	6.6	35	45
MhnA:						
Medaryville	2w	120	4.0	8.0	42	48
MlwB:						
Metea	3e	80	2.6	5.2	28	36
Moon	3e	90	3.0	6.0	32	41
MmyC2:						
Miami	3e	90	3.0	6.0	32	41
MnzB:						
Miami	2e	105	3.5	7.0	37	47
Williamstown	2e	110	3.6	7.2	39	50
MouA:						
Milford	2w	135	4.5	9.0	47	61
MtoA:						
Moon	3s	90	3.0	6.0	32	41
Ormas	3s	70	2.3	4.6	25	35

See footnote at end of table.

Table 8.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Pasture	Soybeans	Winter wheat
		Bu	Tons	AUM*	Bu	Bu
MtoB:						
Moon	3e	90	3.0	6.0	32	41
Ormas	3e	70	2.3	4.6	25	35
MtpA:						
Moon	3s	90	3.0	6.0	32	41
Selfridge	3w	100	3.3	6.6	35	45
MupA:						
Morocco	4s	75	2.5	5.0	26	34
MvhAN:						
Moston, drained	4w	110	3.6	7.2	39	44
MvhAU:						
Moston, undrained	5w	---	---	---	---	---
MwzAN:						
Muskego, drained	4w	110	3.6	7.2	39	44
MwzAU:						
Muskego, undrained	6w	---	---	---	---	---
NofA:						
Newton	4w	90	3.0	6.0	32	40
Morocco	4s	70	2.3	4.6	25	32
OacA:						
Oakville	4s	50	1.7	3.4	18	23
Denham	4s	60	2.0	4.0	21	27
OacB:						
Oakville	4s	50	1.7	3.4	18	23
Denham	4s	60	2.0	4.0	21	27
OaeC:						
Oakville	6s	40	1.3	2.6	14	18
OaeD:						
Oakville	6s	25	0.8	1.6	9	11
OeaA:						
Odell	2w	125	4.1	8.2	44	56
OecA:						
Odell	2w	125	4.1	8.2	44	56
Francesville	2w	115	3.8	7.6	40	52
Pmg:						
Pits, gravel.						
Pps:						
Pits, quarries, limestone.						

See footnote at end of table.

Table 8.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Pasture	Soybeans	Winter wheat
		Bu	Tons	AUM*	Bu	Bu
RebA:						
Radioville----------	2w	150	5.0	10.0	53	60
Mermill------------	2w	140	4.6	9.2	49	56
RevA:						
Rensselaer----------	2w	150	5.0	10.0	53	60
Radioville----------	2w	150	5.0	10.0	53	60
ReyA:						
Rensselaer----------	2w	150	5.0	10.0	53	60
RhcA:						
Riddles-------------	1	105	3.5	7.0	37	47
ScuA:						
Sebewa--------------	2w	120	4.0	8.0	42	60
SdzcB:						
Selfridge-----------	3w	100	3.3	6.6	35	45
Brems---------------	4s	60	2.0	4.0	21	27
SgzA:						
Selfridge-----------	3w	100	3.3	6.6	35	45
ShaA:						
Selfridge-----------	3w	100	3.3	6.6	35	45
Morocco-------------	4s	70	2.3	4.6	25	32
SmsAK:						
Sloan---------------	2w	135	4.5	9.0	47	54
SnlA:						
Southwest-----------	2w	135	4.5	9.0	47	54
SwiA:						
Strole--------------	2w	110	3.6	7.2	39	50
SwxA:						
Sumava--------------	2w	120	4.0	8.0	42	48
TmaAN:						
Toto, drained-------	4w	110	3.6	7.2	39	44
TmaAU:						
Toto, undrained-----	5w	---	---	---	---	---
UbrA:						
Udorthents, clayey.						
W:						
Water.						
WmgA:						
Whiskerville--------	2s	100	3.3	6.6	35	40
Bronson-------------	2s	90	3.0	6.0	32	36

See footnote at end of table.

Table 8.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Pasture	Soybeans	Winter wheat
		Bu	Tons	AUM*	Bu	Bu
WmiA:						
Whitepost-----------	2w	110	3.6	7.2	39	44
Gilford-------------	2w	120	4.0	8.0	42	48
WoeB:						
Williamstown--------	2e	110	3.6	7.2	39	50
Crosier-------------	2w	115	3.8	7.6	40	52
WogA:						
Williamstown--------	2s	110	3.6	7.2	39	50
WoxA:						
Williamstown--------	2s	110	3.6	7.2	39	50
Winamac-------------	2s	90	3.0	6.0	32	36
WoxB:						
Williamstown--------	2e	110	3.6	7.2	39	50
Winamac-------------	2e	90	3.0	6.0	32	36
WpaA:						
Winamac-------------	2s	90	3.0	6.0	32	36
Bronson-------------	2s	90	3.0	6.0	32	36
WpbA:						
Winamac-------------	2s	90	3.0	6.0	32	36
WpbB:						
Winamac-------------	2e	90	3.0	6.0	32	36
WrxAN:						
Wunabuna------------	2w	135	4.5	9.0	47	54

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Table 9.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

Map symbol	Soil name
BrvA	Brady fine sandy loam, 0 to 1 percent slopes (where drained)
BupB	Bronson fine sandy loam, 1 to 4 percent slopes
BuuA	Brookston loam, 0 to 1 percent slopes (where drained)
BuzA	Brookston-Navunon loams, 0 to 1 percent slopes (where drained)
BwfA	Budd-Brady fine sandy loams, 0 to 1 percent slopes (where drained)
CmbAI	Cohoctah loam, 0 to 1 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
CnzAI	Cohoctah-Abscota complex, 0 to 1 percent slopes, frequently flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
CpcA	Conover loam, 0 to 1 percent slopes (where drained)
CqmA	Corwin fine sandy loam, 0 to 1 percent slopes
CuyA	Crosier fine sandy loam, 0 to 1 percent slopes (where drained)
GcwA	Gilford fine sandy loam, 0 to 1 percent slopes (where drained)
GdvA	Gilford-Monon fine sandy loams, 0 to 1 percent slopes (where drained)
GmnA	Goodell-Gilford fine sandy loams, 0 to 1 percent slopes (where drained)
HbzA	Headlee-Brady fine sandy loams, 0 to 1 percent slopes (where drained)
HnbA	Homer sandy loam, 0 to 1 percent slopes (where drained)
MhnA	Medaryville fine sandy loam, 0 to 1 percent slopes (where drained)
MlwB	Metea-Moon loamy sands, 1 to 5 percent slopes
MnzB	Miami-Williamstown fine sandy loams, 2 to 5 percent slopes
MouA	Milford silty clay loam, 0 to 1 percent slopes (where drained)
MtpA	Moon-Selfridge complex, 0 to 1 percent slopes
OeaA	Odell fine sandy loam, 0 to 1 percent slopes (where drained)
OecA	Odell-Francesville fine sandy loams, 0 to 1 percent slopes (where drained)
RebA	Radioville-Mermill loams, 0 to 1 percent slopes (where drained)
RevA	Rensselaer-Radioville loams, 0 to 1 percent slopes (where drained)
ReyA	Rensselaer loam, 0 to 1 percent slopes (where drained)
RhcA	Riddles fine sandy loam, 0 to 2 percent slopes
ScuA	Sebewa loam, 0 to 1 percent slopes (where drained)
SgzA	Selfridge loamy fine sand, 0 to 1 percent slopes (where drained)
ShaA	Selfridge-Morocco loamy fine sands, 0 to 1 percent slopes (where drained)
SmsAK	Sloan silt loam, 0 to 1 percent slopes, occasionally flooded, brief duration (where drained and either protected from flooding or not frequently flooded during the growing season)
SnlA	Southwest silt loam, 0 to 1 percent slopes (where drained)
SwiA	Strole silt loam, 0 to 1 percent slopes (where drained)
SwxA	Sumava fine sandy loam, 0 to 1 percent slopes (where drained)
WmgA	Whiskerville-Bronson fine sandy loams, 0 to 1 percent slopes
WmiA	Whitepost-Gilford fine sandy loams, 0 to 1 percent slopes (where drained)
WoeB	Williamstown-Crosier fine sandy loams, 1 to 5 percent slopes
WogA	Williamstown fine sandy loam, 0 to 2 percent slopes
WoxA	Williamstown-Winamac fine sandy loams, 0 to 1 percent slopes
WoxB	Williamstown-Winamac fine sandy loams, 1 to 5 percent slopes
WpaA	Winamac-Bronson fine sandy loams, 0 to 1 percent slopes
WpbA	Winamac fine sandy loam, 0 to 1 percent slopes
WpbB	Winamac fine sandy loam, 1 to 5 percent slopes (where drained)
WrxAN	Wunabuna silt loam, drained, 0 to 1 percent slopes (where drained)

Table 10.--Hydric Soils

Map symbol	Soil name
AatAN	Ackerman muck, drained, 0 to 1 percent slopes
AatAU	Ackerman muck, undrained, 0 to 1 percent slopes
AbhAN	Adrian muck, drained, 0 to 1 percent slopes
AbhAU	Adrian muck, undrained, 0 to 1 percent slopes
ApuAN	Antung muck, drained, 0 to 1 percent slopes
ApuAU	Antung muck, undrained, 0 to 1 percent slopes
BuuA	Brookston loam, 0 to 1 percent slopes
BuzA	Brookston-Navunon loams, 0 to 1 percent slopes
CmbAI	Cohoctah loam, 0 to 1 percent slopes, frequently flooded, brief duration
EchAN	Edwards muck, drained, 0 to 1 percent slopes
EchAU	Edwards muck, undrained, 0 to 1 percent slopes
EcrAN	Edselton muck, drained, 0 to 1 percent slopes
EcrAU	Edselton muck, undrained, 0 to 1 percent slopes
GcwA	Gilford fine sandy loam, 0 to 1 percent slopes
GdvA	Gilford-Monon fine sandy loams, 0 to 1 percent slopes
GmnA	Goodell-Gilford fine sandy loams, 0 to 1 percent slopes
GrfA	Granby loamy fine sand, 0 to 1 percent slopes
GsaA	Granby-Gilford complex, 0 to 1 percent slopes
HtbAN	Houghton muck, drained, 0 to 1 percent slopes
HtbAU	Houghton muck, undrained, 0 to 1 percent slopes
MfrAN	Madaus muck, drained, 0 to 1 percent slopes
MfrAU	Madaus muck, undrained, 0 to 1 percent slopes
MgyA	Maumee-Gilford complex, 0 to 1 percent slopes
MgzA	Maumee-Gumz complex, 0 to 1 percent slopes
MhaA	Maumee loamy fine sand, 0 to 1 percent slopes
MhbA	Maumee mucky loamy fine sand, 0 to 1 percent slopes
MouA	Milford silty clay loam, 0 to 1 percent slopes
MvhAN	Moston muck, drained, 0 to 1 percent slopes
MvhAU	Moston muck, undrained, 0 to 1 percent slopes
MwzAN	Muskego muck, drained, 0 to 1 percent slopes
MwzAU	Muskego muck, undrained, 0 to 1 percent slopes
NofA	Newton-Morocco loamy fine sands, 0 to 1 percent slopes
RebA	Radioville-Mermill loams, 0 to 1 percent slopes
RevA	Rensselaer-Radioville loams, 0 to 1 percent slopes
ReyA	Rensselaer loam, 0 to 1 percent slopes
ScuA	Sebewa loam, 0 to 1 percent slopes
SmsAK	Sloan silt loam, 0 to 1 percent slopes, occasionally flooded, brief duration
SnlA	Southwest silt loam, 0 to 1 percent slopes
TmaAN	Toto muck, drained, 0 to 1 percent slopes
TmaAU	Toto muck, undrained, 0 to 1 percent slopes
WmiA	Whitepost-Gilford fine sandy loams, 0 to 1 percent slopes
WrxAN	Wunabuna silt loam, drained, 0 to 1 percent slopes

Table 11.--Windbreaks and Environmental Plantings

(Only the soils suitable for windbreaks and environmental plantings are listed. Absence of an entry indicates that trees generally do not grow to the given height.)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
AadAK:					
Abscota-----------	American elder, black chokeberry, common winterberry, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
AatAN:					
Ackerman, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, Carolina poplar, red maple, silver maple.
AbhAN:					
Adrian, drained---	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.
ApuAN:					
Antung, drained---	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
BrvA:					
Brady	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
BstA:					
Brems	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
BstB:					
Brems	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
BswA:					
Brems	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Morocco	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
BupB:					
Bronson	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
BuuA:					
Brookston	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
BuzA:					
Brookston	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Navunon	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, pecan, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
BwfA:					
Budd	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
BwfA:					
Brady	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
CjfC:					
Chelsea	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
CjfD:					
Chelsea	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
CmbAI:					
Cohoctah	American elder, black chokeberry, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, roughleaf dogwood.	Common hackberry, northern white-cedar, shingle oak, tamarack.	Blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
CnzAI:					
Cohoctah	American elder, black chokeberry, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, roughleaf dogwood.	Common hackberry, northern white-cedar, shingle oak, tamarack.	Blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
CnzAI: Abscota	American elder, black chokeberry, common winterberry, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
CpcA: Conover	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
CqmA: Corwin	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.
CuyA: Crosier	American elder, black chokeberry, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, green ash, pin oak, red maple, swamp white oak.	Eastern cottonwood, imperial Carolina poplar.
DbsA: Denham	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
DbsB:					
Denham	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
EchAN:					
Edwards, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.
EcrAN:					
Edselton, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.
GcwA:					
Gilford	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
GdvA:					
Gilford	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Monon	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
GmnA:					
Goodell	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Gilford	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
GrfA:					
Granby	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
GsaA:					
Granby	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Gilford	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
HbzA:					
Headlee	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
HbzA:					
Brady	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
HnbA:					
Homer	American elder, black chokeberry, common juniper, coralberry, highbush cranberry, silky dogwood.	Flame sumac, hazelnut, roughleaf dogwood, smooth sumac, staghorn sumac.	Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, imperial Carolina poplar.
HtbAN:					
Houghton, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.
MfrAN:					
Madaus, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
MgyA:					
Maumee	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Gilford	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
MgzA:					
Maumee	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Gumz	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
MhaA:					
Maumee	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
MhbA:					
Maumee	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
MhnA:					
Medaryville	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
MlwB:					
Metea	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Moon	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
MmyC2:					
Miami	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.
MnzB:					
Miami	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.
Williamstown	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.
MouA:					
Milford	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
MtoA:					
Moon	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
MtoA:					
Ormas	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
MtoB:					
Moon	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Ormas	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
MtpA:					
Moon	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Selfridge	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
MupA:					
Morocco	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
MvhAN:					
Moston, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.
MwzAN:					
Muskego, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.
NofA:					
Newton	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, pecan, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Morocco	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
OacA:					
Oakville	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Denham	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
OacB:					
Oakville	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
Denham	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
OaeC:					
Oakville	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
OaeD:					
Oakville	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
OeaA:					
Odell	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
OecA:					
Odell	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
Francesville	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
RebA:					
Radioville	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
RebA:					
Mermill	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
RevA:					
Rensselaer	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
Radioville	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
ReyA:					
Rensselaer	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
RhcA:					
Riddles	American elder, black chokeberry, common juniper, common winterberry, coralberry, gray dogwood, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, sweet crabapple, witchhazel.	American plum, Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, prairie crabapple, serviceberry.	Norway spruce, black cherry, black walnut, blackgum, green ash, northern red oak, pin oak, red pine, tuliptree, white oak.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
ScuA:					
Sebewa	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
SdzcB:					
Selfridge	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Brems	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
SgzA:					
Selfridge	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
ShaA:					
Selfridge	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Morocco	American elder, highbush cranberry, silky dogwood.	Blackhaw, flame sumac, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac.	American plum, Washington hawthorn, common hackberry, eastern redcedar, serviceberry.	Blackgum, bur oak, green ash, red maple, river birch.	Eastern cottonwood, eastern white pine, imperial Carolina poplar.
SmsAK:					
Sloan	American elder, black chokeberry, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, roughleaf dogwood.	Common hackberry, northern white-cedar, shingle oak, tamarack.	Blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
SnlA:					
Southwest	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
SwiA:					
Strole	American elder, black chokeberry, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, green ash, pin oak, red maple, swamp white oak.	Eastern cottonwood, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
SwxA:					
Sumava	American elder, black chokeberry, common juniper, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, prairie crabapple, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, common hackberry, common persimmon, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple, tuliptree.
TmaAN:					
Toto, drained	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Alternateleaf dogwood, hazel alder, nannyberry, roughleaf dogwood.	Common persimmon, northern white-cedar, tamarack.	Pin oak, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, red maple, silver maple.
WmgA:					
Whiskerville	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Bronson	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
WmiA:					
Whitepost	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
WmiA:					
Gilford	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.
WoeB:					
Williamstown	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.
Crosier	American elder, black chokeberry, common winterberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Blackhaw, cock's-spur hawthorn, common pawpaw, hazel alder, nannyberry, roughleaf dogwood, southern arrowwood, witchhazel.	Washington hawthorn, eastern redcedar, northern white-cedar, shingle oak, tamarack.	Norway spruce, green ash, pin oak, red maple, swamp white oak.	Eastern cottonwood, imperial Carolina poplar.
WogA:					
Williamstown	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
WoxA:					
Williamstown	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.
Winamac	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
WoxB:					
Williamstown	Black chokeberry, common juniper, coralberry, gray dogwood, silky dogwood.	Blackhaw, flame sumac, hazelnut, nannyberry, prairie crabapple, roughleaf dogwood, smooth sumac, southern arrowwood, staghorn sumac, witchhazel.	American plum, Washington hawthorn, common hackberry, eastern redcedar, northern white-cedar, serviceberry.	Norway spruce, black oak, blackgum, bur oak, chinkapin oak.	Eastern cottonwood, eastern white pine, green ash, imperial Carolina poplar.
Winamac	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
WpaA:					
Winamac	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
Bronson	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.

Table 11.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
WpbA:					
Winamac	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
WpbB:					
Winamac	American elder, highbush cranberry, northern spicebush, redosier dogwood, silky dogwood.	Hazel alder, roughleaf dogwood.	Washington hawthorn, common hackberry, northern white-cedar.	Norway spruce, blackgum, bur oak, green ash, pin oak, red maple, river birch, swamp white oak, sweetgum.	Eastern cottonwood, imperial Carolina poplar.
WrxAN:					
Wunabuna	American elder, black chokeberry, buttonbush, common winterberry, gray dogwood, highbush blueberry, highbush cranberry, ninebark, northern spicebush, redosier dogwood, silky dogwood.	Cock's-spur hawthorn, hazel alder, nannyberry, roughleaf dogwood.	Common hackberry, green hawthorn, northern white-cedar, shingle oak, tamarack.	Norway spruce, blackgum, river birch, swamp white oak, sweetgum.	Eastern cottonwood, green ash, imperial Carolina poplar, pin oak, red maple.

Table 12.--Forestland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. See text for definitions of terms used in this table.)

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber*	Suggested trees to plant
AadAK:						
Abscota	Slight	Slight	American sycamore	---	---	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Eastern cottonwood	---	---	
			Northern red oak	80	86	
			Silver maple	---	---	
			White ash	80	86	
AatAN:						
Ackerman, drained	Severe	Slight	Eastern cottonwood	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Quaking aspen	---	---	
			Red maple	46	29	
			Silver maple	---	---	
			White ash	---	---	
AatAU:						
Ackerman, undrained	Severe	Slight	Eastern cottonwood	---	---	---
			Quaking aspen	---	---	
			Red maple	46	29	
			Silver maple	---	---	
			White ash	---	---	
AbhAN:						
Adrian, drained	Severe	Slight	Green ash	69	57	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Red maple	53	29	
			Silver maple	78	29	
			White ash	69	57	
			Tamarack	45	29	
			Quaking aspen	60	57	
AbhAU:						
Adrian, undrained	Severe	Slight	Green ash	69	57	---
			Silver maple	78	29	
			Red maple	53	29	
			White ash	69	57	
			Quaking aspen	60	57	
			Tamarack	45	29	
ApuAN:						
Antung, drained	Severe	Slight	Green ash	69	57	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Quaking aspen	60	57	
			Red maple	53	29	
			Silver maple	78	29	
			Tamarack	45	29	
			White ash	69	57	
ApuAU:						
Antung, undrained	Severe	Slight	Green ash	69	57	---
			Quaking aspen	60	57	
			Red maple	53	29	
			Silver maple	78	29	
			Tamarack	45	29	
			White ash	69	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
BrvA:						
Brady	Slight	Slight	Black oak	90	72	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Bur oak	---	---	
			Green ash	---	---	
			Quaking aspen	---	---	
			Red maple	---	---	
			Slippery elm	---	---	
BstA:						
Brems	Slight	Slight	Black oak	72	57	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Eastern white pine	65	143	
			Jack pine	70	100	
			Northern red oak	70	57	
BstB:						
Brems	Slight	Slight	Black oak	72	57	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Eastern white pine	65	143	
			Jack pine	70	100	
			Northern red oak	70	57	
BswA:						
Brems	Slight	Slight	Black oak	72	57	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Eastern white pine	65	143	
			Jack pine	70	100	
			Northern red oak	70	57	
Morocco	Moderate	Slight	Eastern white pine	65	143	Bur oak, green ash, red maple, shingle oak, silver maple, white ash, white oak.
			Northern red oak	70	57	
			Pin oak	85	72	
BupB:						
Bronson	Slight	Slight	American basswood	---	---	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			American beech	---	---	
			Black walnut	---	---	
			Northern red oak	66	57	
			Shagbark hickory	---	---	
			Sugar maple	61	43	
			White oak	66	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
BuuA:						
Brookston	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Northern red oak	78	57	
			Sweetgum	90	100	
			White oak	75	57	
BuzA:						
Brookston	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Northern red oak	78	57	
			Sweetgum	90	100	
			White oak	75	57	
Navunon	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Northern red oak	78	57	
			Sweetgum	90	100	
			White oak	75	57	
BwfA:						
Budd	Slight	Slight	Black oak	90	72	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Bur oak	---	---	
			Green ash	---	---	
			Quaking aspen	---	---	
			Red maple	---	---	
			Slippery elm	---	---	
Brady	Slight	Slight	Black oak	90	72	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Bur oak	---	---	
			Green ash	---	---	
			Quaking aspen	---	---	
			Red maple	---	---	
			Slippery elm	---	---	
CjfC:						
Chelsea	Moderate	Slight	White oak	55	43	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
CjfD:						
Chelsea	Moderate	Moderate	White oak	55	43	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
CmbAI:						
Cohoctah	Moderate	Slight	Black cherry	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern cottonwood	---	---	
			Green ash	70	72	
			Pin oak	---	---	
			Red maple	72	43	
			Silver maple	95	43	
			Swamp white oak	---	---	
CnzAI:						
Cohoctah	Moderate	Slight	Black cherry	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern cottonwood	---	---	
			Green ash	70	72	
			Pin oak	---	---	
			Red maple	72	43	
			Silver maple	95	43	
			Swamp white oak	---	---	
Abscota	Slight	Slight	American sycamore	---	---	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Eastern cottonwood	---	---	
			Northern red oak	80	86	
			Silver maple	---	---	
			White ash	80	86	
CpcA:						
Conover	Moderate	Slight	Northern red oak	75	57	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Pin oak	85	72	
			Sweetgum	80	86	
			Tuliptree	85	86	
CqmA:						
Corwin	Moderate	Slight	---	---	---	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
CuyA:						
Crosier	Moderate	Slight	Northern red oak	75	57	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Pin oak	85	72	
			Sweetgum	80	86	
			Tuliptree	85	86	
			White oak	75	57	
DbsA:						
Denham	Moderate	Slight	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	
DbsB:						
Denham	Moderate	Slight	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	
EchAN:						
Edwards, drained	Severe	Slight	Green ash	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Red maple	56	29	
			Silver maple	---	---	
			Swamp white oak	---	---	
			Tamarack	---	---	
			White ash	---	---	
EchAU:						
Edwards, undrained	Severe	Slight	Green ash	---	---	---
			Red maple	56	29	
			Silver maple	---	---	
			Swamp white oak	---	---	
			Tamarack	---	---	
			White ash	---	---	
EcrAN:						
Edselton, drained	Severe	Slight	Black willow	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Quaking aspen	56	57	
			Red maple	51	29	
			Silver maple	76	29	
			White ash	51	29	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
EcrAU:						
Edselton, undrained	Severe	Slight	Black willow	---	---	---
			Quaking aspen	56	57	
			Red maple	51	29	
			Silver maple	76	29	
			White ash	51	29	
GcwA:						
Gilford	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Red maple	60	43	
GdvA:						
Gilford	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Red maple	60	43	
Monon	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	75	172	
			Pin oak	70	57	
			Red maple	70	43	
GmnA:						
Goodell	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Red maple	60	43	
Gilford	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Red maple	60	43	
GrfA:						
Granby	Moderate	Slight	Pin oak	70	57	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	75	172	
			Quaking aspen	70	86	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
GsaA:						
Granby	Moderate	Slight	Pin oak	70	57	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	75	172	
			Quaking aspen	70	86	
Gilford	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Red maple	60	43	
HbzA:						
Headlee	Slight	Slight	Black cherry	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Northern red oak	80	57	
			Pin oak	90	72	
			Sugar maple	---	---	
			Tuliptree	---	---	
			White ash	---	---	
			White oak	75	57	
Brady	Slight	Slight	Black oak	90	72	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Bur oak	---	---	
			Green ash	---	---	
			Quaking aspen	---	---	
			Red maple	---	---	
			Slippery elm	---	---	
HnbA:						
Homer	Slight	Slight	Pin oak	85	72	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Sweetgum	80	86	
			Tuliptree	85	86	
			White oak	70	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
HtbAN:						
Houghton, drained	Severe	Slight	Silver maple	82	29	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			White ash	56	43	
			Red maple	56	29	
			Green ash	---	---	
			Arborvitae	37	57	
			Tamarack	52	43	
			Quaking aspen	60	57	
HtbAU:						
Houghton, undrained	Severe	Slight	Silver maple	76	29	Pin oak.
			Red maple	51	29	
			White ash	51	29	
			Black willow	---	---	
			Quaking aspen	56	57	
MfrAN:						
Madaus, drained	Severe	Slight	Red maple	55	29	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
MfrAU:						
Madaus, undrained	Severe	Slight	Red maple	55	29	---
MgyA:						
Maumee	Moderate	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Silver maple	---	---	
Gilford	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Red maple	60	43	
MgzA:						
Maumee	Moderate	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Silver maple	---	---	
Gumz	Moderate	Slight	Pin oak	70	57	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	75	172	
			Quaking aspen	70	86	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
MhaA:						
Maumee	Moderate	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Silver maple	---	---	
MhbA:						
Maumee	Moderate	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Silver maple	---	---	
MhnA:						
Medaryville	Slight	Slight	---	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
MlwB:						
Metea	Slight	Slight	Eastern white pine	75	172	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Red pine	75	143	
			Tuliptree	86	86	
			White oak	80	57	
Moon	Slight	Slight	Eastern white pine	75	172	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Red pine	75	143	
			Tuliptree	86	86	
			White oak	80	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
MmyC2:						
Miami	Slight	Slight	Sweetgum	76	72	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Tuliptree	98	100	
			White oak	90	72	
MnzB:						
Miami	Slight	Slight	Sweetgum	76	72	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Tuliptree	98	100	
			White oak	90	72	
Williamstown	Slight	Slight	Tuliptree	90	129	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			White ash	90	129	
MouA:						
Milford	Moderate	Slight	---	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
MtoA:						
Moon	Slight	Slight	Eastern white pine	75	172	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Red pine	75	143	
			Tuliptree	86	86	
			White oak	80	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
MtoA:						
Ormas	Slight	Slight	Eastern white pine	---	---	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Red pine	78	114	
			Tuliptree	---	---	
			White oak	70	57	
MtoB:						
Moon	Slight	Slight	Eastern white pine	75	172	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Red pine	75	143	
			Tuliptree	86	86	
			White oak	80	57	
Ormas	Slight	Slight	Eastern white pine	---	---	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Red pine	78	114	
			Tuliptree	---	---	
			White oak	70	57	
MtpA:						
Moon	Slight	Slight	Eastern white pine	75	172	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Red pine	75	143	
			Tuliptree	86	86	
			White oak	80	57	
Selfridge	Slight	Slight	Black oak	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Eastern cottonwood	90	100	
			Quaking aspen	70	86	
			Red maple	---	---	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
MupA:						
Morocco	Moderate	Slight	Eastern white pine	65	143	Bur oak, green ash, red maple, shingle oak, silver maple, white ash, white oak.
			Northern red oak	70	57	
			Pin oak	85	72	
MvhAN:						
Moston, drained	Severe	Slight	Red maple	51	29	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Silver maple	---	---	
			White ash	52	29	
			Green ash	---	---	
			Quaking aspen	56	57	
			Black willow	---	---	
MvhAU:						
Moston, undrained	Severe	Slight	Red maple	51	29	---
			Silver maple	---	---	
			White ash	52	29	
			Green ash	---	---	
			Quaking aspen	56	57	
			Black willow	---	---	
MwzAN:						
Muskego, drained	Severe	Slight	Red maple	51	29	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Silver maple	---	---	
			White ash	52	29	
			Green ash	---	---	
			Quaking aspen	56	57	
			Black willow	---	---	
MwzAU:						
Muskego, undrained	Severe	Slight	Red maple	51	29	---
			Silver maple	---	---	
			White ash	52	29	
			Green ash	---	---	
			Quaking aspen	56	57	
			Black willow	---	---	
NofA:						
Newton	Moderate	Slight	Eastern cottonwood	70	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
Morocco	Moderate	Slight	Eastern white pine	65	143	Bur oak, green ash, red maple, shingle oak, silver maple, white ash, white oak.
			Northern red oak	70	57	
			Pin oak	85	72	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
OacA:						
Oakville	Moderate	Slight	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	
Denham	Moderate	Slight	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	
OacB:						
Oakville	Moderate	Slight	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	
Denham	Moderate	Slight	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	
OaeC:						
Oakville	Moderate	Slight	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	
OaeD:						
Oakville	Moderate	Moderate	Eastern white pine	85	200	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Jack pine	68	100	
			Red pine	78	143	
			White oak	70	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
OeaA:						
Odell	Slight	Slight		---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
OecA:						
Odell	Slight	Slight		---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
Francesville	Slight	Slight		---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
RebA:						
Radioville	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Sweetgum	90	100	
			White oak	75	57	
			Northern red oak	76	57	
Mermill	Moderate	Slight	Eastern cottonwood	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Green ash	---	---	
			Pin oak	90	72	
			Red maple	---	---	
			Swamp white oak	90	72	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
RevA:						
Rensselaer	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Sweetgum	90	100	
			White oak	75	57	
			Northern red oak	76	57	
Radioville	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Sweetgum	90	100	
			White oak	75	57	
			Northern red oak	76	57	
ReyA:						
Rensselaer	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Sweetgum	90	100	
			White oak	75	57	
			Northern red oak	76	57	
RhcA:						
Riddles	Slight	Slight	Northern red oak	90	72	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Sweetgum	76	72	
			Tuliptree	98	100	
			White oak	90	72	
ScuA:						
Sebewa	Moderate	Slight	Pin oak	88	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			White ash	75	72	
			Red maple	---	---	
			White oak	72	72	
			American basswood	---	---	
SdzcB:						
Selfridge	Slight	Slight	Black oak	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Eastern cottonwood	90	100	
			Quaking aspen	70	86	
			Red maple	---	---	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
SdzcB:						
Brems	Slight	Slight	Northern red oak	70	57	Black cherry, black oak, bur oak, chinkapin oak, eastern white pine, red pine, scarlet oak, shingle oak, white oak.
			Eastern white pine	65	143	
			Black oak	72	57	
SgzA:						
Selfridge	Slight	Slight	Black oak	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Eastern cottonwood	90	100	
			Quaking aspen	70	86	
			Red maple	---	---	
ShaA:						
Selfridge	Slight	Slight	Black oak	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Eastern cottonwood	90	100	
			Quaking aspen	70	86	
			Red maple	---	---	
Morocco	Moderate	Slight	Eastern white pine	65	143	Bur oak, green ash, red maple, shingle oak, silver maple, white ash, white oak.
			Northern red oak	70	57	
			Pin oak	85	72	
SmsAK:						
Sloan	Severe	Slight	Eastern cottonwood	---	---	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Green ash	---	---	
			Pin oak	86	72	
			Red maple	---	---	
			Swamp white oak	---	---	
SnlA:						
Southwest	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Silver maple	---	---	
			Green ash	---	---	
			Red maple	70	43	
			Sweetgum	90	100	
			American basswood	---	---	
			White oak	---	---	
			Northern red oak	75	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
SwiA:						
Strole	Moderate	Slight	---	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
SwxA:						
Sumava	Slight	Slight	---	---	---	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
TmaAN:						
Toto, drained	Severe	Slight	Arborvitae	27	43	American sycamore, bur oak, green ash, pin oak, red maple, river birch, silver maple, swamp white oak.
			Eastern cottonwood	86	86	
			Pin oak	60	43	
			Quaking aspen	56	57	
			Red maple	51	29	
			River birch	45	29	
			Silver maple	76	29	
			Tamarack	41	29	
TmaAU:						
Toto, undrained	Severe	Slight	Arborvitae	27	43	---
			Eastern cottonwood	86	86	
			Pin oak	60	43	
			Quaking aspen	56	57	
			Red maple	51	29	
			River birch	45	29	
			Silver maple	76	29	
			Tamarack	41	29	
UbrA:						
Udorthents, clayey	Moderate	Slight	---	---	---	---
WmgA:						
Whiskerville	Slight	Slight	American basswood	---	---	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			American beech	---	---	
			Black walnut	---	---	
			Northern red oak	66	57	
			Shagbark hickory	---	---	
			Sugar maple	61	43	
			White oak	66	57	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
WmgA:						
Bronson	Slight	Slight	American basswood	---	---	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			American beech	---	---	
			Black walnut	---	---	
			Northern red oak	66	57	
			Shagbark hickory	---	---	
			Sugar maple	61	43	
			White oak	66	57	
WmiA:						
Whitepost	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	75	172	
			Pin oak	70	57	
			Red maple	70	43	
Gilford	Slight	Slight	Bigtooth aspen	70	86	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Eastern white pine	55	100	
			Pin oak	70	57	
			Red maple	60	43	
WoeB:						
Williamstown	Slight	Slight	Tuliptree	90	129	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			White ash	90	129	
Crosier	Moderate	Slight	Northern red oak	75	57	American sycamore, Shumard's oak, bur oak, green ash, northern red oak, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak, tamarack, white ash, white oak.
			Pin oak	85	72	
			Sweetgum	80	86	
			Tuliptree	85	86	
			White oak	75	57	
WogA:						
Williamstown	Slight	Slight	Tuliptree	90	129	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			White ash	90	129	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
WoxA:						
Williamstown	Slight	Slight	Tuliptree	90	129	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			White ash	90	129	
Winamac	Slight	Slight	Eastern white pine	85	200	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Jack pine	70	100	
			Northern red oak	70	57	
			Red pine	72	129	
WoxB:						
Williamstown	Slight	Slight	Tuliptree	90	129	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			White ash	90	129	
Winamac	Slight	Slight	Eastern white pine	85	200	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Jack pine	70	100	
			Northern red oak	70	57	
			Red pine	72	129	
WpaA:						
Winamac	Slight	Slight	Eastern white pine	85	200	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Jack pine	70	100	
			Northern red oak	70	57	
			Red pine	72	129	

See footnote at end of table.

Table 12.--Forestland Management and Productivity--Continued

Map symbol and soil name	Hazard of off-road or off-trail erosion	Limitations affecting use of harvesting equipment	Potential productivity: Common trees	Site index	Volume of wood fiber*	Suggested trees to plant
WpaA:						
Bronson	Slight	Slight	American basswood	---	---	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			American beech	---	---	
			Black walnut	---	---	
			Northern red oak	66	57	
			Shagbark hickory	---	---	
			Sugar maple	61	43	
			White oak	66	57	
WpbA:						
Winamac	Slight	Slight	Eastern white pine	85	200	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Jack pine	70	100	
			Northern red oak	70	57	
			Red pine	72	129	
WpbB:						
Winamac	Slight	Slight	Eastern white pine	85	200	Shumard's oak, black cherry, black walnut, bur oak, chinkapin oak, eastern white pine, green ash, northern red oak, red pine, tuliptree, white ash, white oak.
			Jack pine	70	100	
			Northern red oak	70	57	
			Red pine	72	129	
WrxAN:						
Wunabuna	Moderate	Slight	Pin oak	86	72	American sycamore, bur oak, green ash, pin oak, red maple, river birch, shingle oak, silver maple, swamp white oak.
			Green ash	---	---	
			American sycamore	---	---	
			Silver maple	82	29	
			Eastern cottonwood	---	---	
			Black willow	---	---	
			American elm	---	---	

* Volume of wood fiber is the yield in cubic feet per acre per year calculated at the age of culmination of the mean annual increment for fully stocked natural stands.

Table 13.--Forestland Management

(See text for definitions of terms used in this table.)

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
AadAK:					
Abscota	Moderate: flooding.	Moderately suited: flooding.	Low	Moderately suited: flooding.	Moderate: strength.
AatAN:					
Ackerman, drained	Severe: strength, wetness.	Poorly suited: ponding, strength, wetness.	High: wetness, lime.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
AatAU:					
Ackerman, undrained	Severe: strength, wetness.	Poorly suited: ponding, strength.	High: wetness, lime.	Poorly suited: ponding, strength.	Severe: wetness, strength.
AbhAN:					
Adrian, drained	Severe: strength, wetness.	Poorly suited: ponding, strength, wetness.	High: wetness, soil reaction.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
AbhAU:					
Adrian, undrained	Severe: wetness.	Poorly suited: ponding.	High: wetness, soil reaction, lime.	Poorly suited: ponding.	Severe: wetness, strength.
ApuAN:					
Antung, drained	Severe: wetness.	Poorly suited: ponding, wetness.	High: wetness, soil reaction, lime.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
ApuAU:					
Antung, undrained	Severe: wetness.	Poorly suited: ponding.	High: wetness, soil reaction, lime.	Poorly suited: ponding.	Severe: wetness, strength.
BrvA:					
Brady	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
BstA:					
Brems	Slight	Well suited	Low	Well suited	Moderate: strength.
BstB:					
Brems	Slight	Well suited	Low	Well suited	Moderate: strength.
BswA:					
Brems	Slight	Well suited	Low	Well suited	Moderate: strength.
Morocco	Moderate: sandiness.	Moderately suited: wetness, sandiness.	High: wetness.	Moderately suited: wetness, sandiness.	Severe: wetness, strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
BupB:					
Bronson	Slight	Well suited	Low	Well suited	Moderate: strength.
BuuA:					
Brookston	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
BuzA:					
Brookston	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
Navunon	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
BwfA:					
Budd	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
Brady	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
CjfC:					
Chelsea	Moderate: sandiness.	Moderately suited: sandiness, slope.	Low	Moderately suited: sandiness, slope.	Moderate: strength.
CjfD:					
Chelsea	Moderate: slope, sandiness.	Poorly suited: slope, sandiness.	Low	Poorly suited: slope, sandiness.	Moderate: strength.
CmbAI:					
Cohoctah	Severe: flooding, strength.	Poorly suited: flooding, wetness, strength.	High: wetness.	Poorly suited: flooding, wetness, strength.	Severe: wetness, strength.
CnzAI:					
Cohoctah	Severe: flooding, strength.	Poorly suited: flooding, wetness, strength.	High: wetness.	Poorly suited: flooding, wetness, strength.	Severe: wetness, strength.
Abscota	Moderate: flooding.	Moderately suited: flooding.	Low	Moderately suited: flooding.	Moderate: strength.
CpcA:					
Conover	Moderate: strength.	Moderately suited: strength, wetness.	High: wetness.	Moderately suited: strength, wetness.	Severe: strength, wetness.
CqmA:					
Corwin	Moderate: strength.	Moderately suited: strength.	Low	Moderately suited: strength.	Severe: strength.
CuyA:					
Crosier	Moderate: strength.	Moderately suited: strength, wetness.	High: wetness.	Moderately suited: strength, wetness.	Severe: strength, wetness.
DbsA:					
Denham	Moderate: sandiness.	Moderately suited: sandiness.	Low	Moderately suited: sandiness.	Moderate: strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
DbsB:					
Denham	Moderate: sandiness.	Moderately suited: sandiness.	Low	Moderately suited: sandiness.	Moderate: strength.
EchAN:					
Edwards, drained	Severe: strength, wetness.	Poorly suited: ponding, strength, wetness.	High: wetness, soil reaction.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
EchAU:					
Edwards, undrained	Severe: wetness.	Poorly suited: ponding.	High: wetness, lime, soil reaction.	Poorly suited: ponding.	Severe: wetness.
EcrAN:					
Edselton, drained	Severe: strength, wetness.	Poorly suited: ponding, strength, wetness.	High: wetness, lime.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
EcrAU:					
Edselton, undrained	Severe: wetness.	Poorly suited: ponding.	High: wetness, lime, soil reaction.	Poorly suited: ponding.	Severe: wetness, strength.
GcwA:					
Gilford	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
GdvA:					
Gilford	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
Monon	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
GmnA:					
Goodell	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
Gilford	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
GrfA:					
Granby	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
GsaA:					
Granby	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
Gilford	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
HbzA:					
Headlee	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
Brady	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
HnbA:					
Homer	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
HtbAN:					
Houghton, drained	Severe: strength, wetness.	Poorly suited: ponding, strength, wetness.	High: wetness, soil reaction.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
HtbAU:					
Houghton, undrained	Severe: wetness.	Poorly suited: ponding.	High: wetness.	Poorly suited: ponding.	Severe: wetness.
MfrAN:					
Madaus, drained	Severe: wetness.	Poorly suited: ponding, wetness.	High: wetness, lime, soil reaction.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
MfrAU:					
Madaus, undrained	Severe: wetness.	Poorly suited: ponding.	High: wetness, lime, soil reaction.	Poorly suited: ponding.	Severe: wetness, strength.
MgyA:					
Maumee	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
Gilford	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
MgzA:					
Maumee	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
Gumz	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
MhaA:					
Maumee	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
MhbA:					
Maumee	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
MhnA:					
Medaryville	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
MlwB:					
Metea	Slight	Well suited	Low	Well suited	Moderate: strength.
Moon	Slight	Well suited	Low	Well suited	Moderate: strength.
MmyC2:					
Miami	Slight	Moderately suited: slope.	Low	Moderately suited: slope.	Moderate: strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
MnzB:					
Miami	Slight	Well suited	Low	Well suited	Moderate: strength.
Williamstown	Slight	Well suited	Low	Well suited	Moderate: strength.
MouA:					
Milford	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: wetness, strength.
MtoA:					
Moon	Slight	Well suited	Low	Well suited	Moderate: strength.
Ormas	Slight	Well suited	Low	Well suited	Moderate: strength.
MtoB:					
Moon	Slight	Well suited	Low	Well suited	Moderate: strength.
Ormas	Slight	Well suited	Low	Well suited	Moderate: strength.
MtpA:					
Moon	Slight	Well suited	Low	Well suited	Moderate: strength.
Selfridge	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Moderate: strength.
MupA:					
Morocco	Moderate: sandiness.	Moderately suited: wetness, sandiness.	High: wetness.	Moderately suited: wetness, sandiness.	Severe: wetness, strength.
MvhAN:					
Moston, drained	Severe: strength, wetness.	Poorly suited: ponding, strength, wetness.	High: wetness, soil reaction.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
MvhAU:					
Moston, undrained	Severe: strength, wetness.	Poorly suited: ponding, strength.	High: wetness, soil reaction.	Poorly suited: ponding, strength.	Severe: wetness, strength.
MwzAN:					
Muskego, drained	Severe: strength, wetness.	Poorly suited: ponding, strength, wetness.	High: wetness, soil reaction.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
MwzAU:					
Muskego, undrained	Severe: strength, wetness.	Poorly suited: ponding, strength.	High: wetness, soil reaction.	Poorly suited: ponding, strength.	Severe: wetness, strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
NofA:					
Newton	Moderate: wetness.	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
Morocco	Moderate: sandiness.	Moderately suited: wetness, sandiness.	High: wetness.	Moderately suited: wetness, sandiness.	Severe: wetness, strength.
OacA:					
Oakville	Moderate: sandiness.	Moderately suited: sandiness.	Low	Moderately suited: sandiness.	Moderate: strength.
Denham	Moderate: sandiness.	Moderately suited: sandiness.	Low	Moderately suited: sandiness.	Moderate: strength.
OacB:					
Oakville	Moderate: sandiness.	Moderately suited: sandiness.	Low	Moderately suited: sandiness.	Moderate: strength.
Denham	Moderate: sandiness.	Moderately suited: sandiness.	Low	Moderately suited: sandiness.	Moderate: strength.
OaeC:					
Oakville	Moderate: sandiness.	Moderately suited: sandiness, slope.	Low	Moderately suited: sandiness, slope.	Moderate: strength.
OaeD:					
Oakville	Moderate: slope, sandiness.	Poorly suited: slope, sandiness.	Low	Poorly suited: slope, sandiness.	Moderate: strength.
OeaA:					
Odell	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
OecA:					
Odell	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
Francesville	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.
Pmg:					
Pits, gravel	Moderate: slope.	Poorly suited: slope.	Moderate: lime.	Poorly suited: slope.	Severe: strength.
Pps:					
Pits, quarries, limestone.					
RebA:					
Radioville	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
Mermill	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: wetness, strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
RevA:					
Rensselaer	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
Radioville	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
ReyA:					
Rensselaer	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
RhcA:					
Riddles	Slight	Well suited	Low	Well suited	Moderate: strength.
ScuA:					
Sebewa	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: strength, wetness.
SdzcB:					
Selfridge	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Moderate: strength.
Brems	Slight	Well suited	Low	Well suited	Moderate: strength.
SgzA:					
Selfridge	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Moderate: strength.
ShaA:					
Selfridge	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Moderate: strength.
Morocco	Moderate: sandiness.	Moderately suited: wetness, sandiness.	High: wetness.	Moderately suited: wetness, sandiness.	Severe: wetness, strength.
SmsAK:					
Sloan	Severe: flooding, wetness, strength.	Poorly suited: ponding, flooding, wetness, strength.	High: wetness.	Poorly suited: ponding, flooding, wetness, strength.	Severe: wetness, strength.
SnlA:					
Southwest	Moderate: strength.	Poorly suited: ponding, wetness, strength.	High: wetness.	Poorly suited: ponding, wetness, strength.	Severe: wetness, strength.
SwiA:					
Strole	Moderate: strength.	Moderately suited: strength, wetness.	High: wetness.	Moderately suited: strength, wetness.	Severe: strength, wetness.
SwxA:					
Sumava	Slight	Moderately suited: wetness.	High: wetness.	Moderately suited: wetness.	Severe: wetness, strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
TmaAN:					
Toto, drained	Severe: strength.	Poorly suited: ponding, strength, wetness.	High: wetness, soil reaction.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.
TmaAU:					
Toto, undrained	Severe: strength, wetness.	Poorly suited: ponding, strength.	High: wetness, lime, soil reaction.	Poorly suited: ponding, strength.	Severe: wetness, strength.
UbrA:					
Udorthents, clayey	Moderate: strength.	Moderately suited: strength.	Moderate: lime, soil reaction.	Moderately suited: strength.	Severe: strength.
W:					
Water.					
WmgA:					
Whiskerville	Slight	Well suited	Low	Well suited	Moderate: strength.
Bronson	Slight	Well suited	Low	Well suited	Moderate: strength.
WmiA:					
Whitepost	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
Gilford	Slight	Poorly suited: ponding, wetness.	High: wetness.	Poorly suited: ponding, wetness.	Severe: wetness, strength.
WoeB:					
Williamstown	Slight	Well suited	Low	Well suited	Moderate: strength.
Crosier	Moderate: strength.	Moderately suited: strength, wetness.	High: wetness.	Moderately suited: strength, wetness.	Severe: strength, wetness.
WogA:					
Williamstown	Slight	Well suited	Low	Well suited	Moderate: strength.
WoxA:					
Williamstown	Slight	Well suited	Low	Well suited	Moderate: strength.
Winamac	Slight	Well suited	Low	Well suited	Moderate: strength.
WoxB:					
Williamstown	Slight	Well suited	Low	Well suited	Moderate: strength.
Winamac	Slight	Well suited	Low	Well suited	Moderate: strength.

Table 13.--Forestland Management--Continued

Map symbol and soil name	Limitations affecting construction of haul roads and log landings	Suitability for log landings	Potential for seedling mortality	Suitability for roads (natural surface)	Soil rutting hazard
WpaA:					
Winamac	Slight	Well suited	Low	Well suited	Moderate: strength.
Bronson	Slight	Well suited	Low	Well suited	Moderate: strength.
WpbA:					
Winamac	Slight	Well suited	Low	Well suited	Moderate: strength.
WpbB:					
Winamac	Slight	Well suited	Low	Well suited	Moderate: strength.
WrxAN:					
Wunabuna	Moderate: strength.	Poorly suited: ponding, strength, wetness.	High: wetness.	Poorly suited: ponding, strength, wetness.	Severe: wetness, strength.

Table 14.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
AadAK:					
Abscota	Very limited: flooding, depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: flooding, depth to saturated zone.	Not limited	Somewhat limited: flooding, droughty, depth to saturated zone.
AatAN:					
Ackerman, drained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
AatAU:					
Ackerman, undrained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
AbhAN:					
Adrian, drained	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
AbhAU:					
Adrian, undrained	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
ApuAN:					
Antung, drained	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
ApuAU:					
Antung, undrained	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
BrvA:					
Brady	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
BstA:					
Brems	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: droughty.
BstB:					
Brems	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy, slope.	Somewhat limited: too sandy.	Somewhat limited: droughty.
BswA:					
Brems	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: droughty.
Morocco	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, droughty.
BupB:					
Bronson	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, slope.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
BuuA:					
Brookston	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
BuzA:					
Brookston	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
Navunon	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
BwfA:					
Budd	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
Brady	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
CjfC:					
Chelsea	Somewhat limited: too sandy, slope.	Somewhat limited: too sandy, slope.	Very limited: slope, too sandy.	Somewhat limited: too sandy.	Somewhat limited: droughty, slope.
CjfD:					
Chelsea	Very limited: slope, too sandy.	Very limited: slope, too sandy.	Very limited: slope, too sandy.	Somewhat limited: too sandy.	Very limited: slope, droughty.
CmbAI:					
Cohoctah	Very limited: depth to saturated zone, flooding.	Very limited: depth to saturated zone, flooding.	Very limited: depth to saturated zone, flooding.	Very limited: depth to saturated zone, flooding.	Very limited: flooding, depth to saturated zone.
CnzAI:					
Cohoctah	Very limited: depth to saturated zone, flooding.	Very limited: depth to saturated zone, flooding.	Very limited: depth to saturated zone, flooding.	Very limited: depth to saturated zone, flooding.	Very limited: flooding, depth to saturated zone.
Abscota	Very limited: flooding, depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: flooding, depth to saturated zone.	Not limited	Somewhat limited: flooding, droughty, depth to saturated zone.
CpcA:					
Conover	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
CqmA:					
Corwin	Very limited: depth to saturated zone, restricted permeability.	Somewhat limited: depth to saturated zone, restricted permeability.	Somewhat limited: depth to saturated zone, restricted permeability.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
CuyA:					
Crosier	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
DbsA:					
Denham	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy.	Somewhat limited: droughty.
DbsB:					
Denham	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy, slope.	Very limited: too sandy.	Somewhat limited: droughty.
EchAN:					
Edwards, drained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content.
EchAU:					
Edwards, undrained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content.
EcrAN:					
Edselton, drained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
EcrAU:					
Edselton, undrained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content.
GcwA:					
Gilford	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
GdvA:					
Gilford	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
Monon	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
GmnA:					
Goodell	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
Gilford	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
GrfA:					
Granby	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, droughty.
GsaA:					
Granby	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, droughty.
Gilford	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
HbzA:					
Headlee	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
Brady	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
HnbA:					
Homer	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, gravel content.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
HtbAN:					
Houghton, drained	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
HtbAU:					
Houghton, undrained	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
MfrAN:					
Madaus, drained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content, droughty.
MfrAU:					
Madaus, undrained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content, droughty.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
MgyA:					
Maumee	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, droughty.
Gilford	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
MgzA:					
Maumee	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, droughty.
Gumz	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone, droughty.
MhaA:					
Maumee	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, droughty.
MhbA:					
Maumee	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone.
MhnA:					
Medaryville	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
MlwB:					
Metea	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy, slope.	Somewhat limited: too sandy.	Not limited.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
MlwB:					
Moon	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: slope, too sandy, depth to saturated zone, gravel content.	Somewhat limited: too sandy.	Somewhat limited: depth to saturated zone.
MmyC2:					
Miami	Not limited	Not limited	Very limited: slope.	Not limited	Not limited.
MnzB:					
Miami	Not limited	Not limited	Somewhat limited: slope.	Not limited	Not limited.
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, slope.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
MouA:					
Milford	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.
MtoA:					
Moon	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: too sandy, depth to saturated zone, gravel content.	Somewhat limited: too sandy.	Somewhat limited: depth to saturated zone.
Ormas	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: droughty.
MtoB:					
Moon	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: slope, too sandy, depth to saturated zone, gravel content.	Somewhat limited: too sandy.	Somewhat limited: depth to saturated zone.
Ormas	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy, slope.	Somewhat limited: too sandy.	Somewhat limited: droughty.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
MtpA:					
Moon	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: too sandy, depth to saturated zone.	Somewhat limited: too sandy, depth to saturated zone, gravel content.	Somewhat limited: too sandy.	Somewhat limited: depth to saturated zone.
Selfridge	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone.
MupA:					
Morocco	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, droughty.
MvhAN:					
Moston, drained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
MvhAU:					
Moston, undrained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
MwzAN:					
Muskego, drained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
MwzAU:					
Muskego, undrained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone.
NofA:					
Newton	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, droughty.
Morocco	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, droughty.
OacA:					
Oakville	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy.	Somewhat limited: droughty.
Denham	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy.	Somewhat limited: droughty.
OacB:					
Oakville	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy, slope.	Very limited: too sandy.	Somewhat limited: droughty.
Denham	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy, slope.	Very limited: too sandy.	Somewhat limited: droughty.
OaeC:					
Oakville	Very limited: too sandy.	Very limited: too sandy.	Very limited: too sandy, slope.	Very limited: too sandy.	Somewhat limited: droughty.
OaeD:					
Oakville	Very limited: too sandy, slope.	Very limited: too sandy, slope.	Very limited: slope, too sandy.	Very limited: too sandy.	Very limited: slope, droughty.
OeaA:					
Odell	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
OecA:					
Odell	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
Francesville	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
Pmg:					
Pits, gravel	Not rated	Not rated	Not rated	Not rated	Not rated.
Pps:					
Pits, quarries, limestone	Not rated	Not rated	Not rated	Not rated	Not rated.
RebA:					
Radioville	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
Mermill	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.
RevA:					
Rensselaer	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
Radioville	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
ReyA:					
Rensselaer	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
RhcA:					
Riddles	Not limited	Not limited	Not limited	Not limited	Not limited.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
ScuA:					
Sebewa	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding, gravel content.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
SdzcB:					
Selfridge	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone.
Brems	Somewhat limited: too sandy.	Somewhat limited: too sandy.	Somewhat limited: too sandy, slope.	Somewhat limited: too sandy.	Somewhat limited: droughty.
SgzA:					
Selfridge	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone.
ShaA:					
Selfridge	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy, restricted permeability.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone.
Morocco	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, too sandy.	Very limited: depth to saturated zone, droughty.
SmsAK:					
Sloan	Very limited: depth to saturated zone, flooding, ponding.	Very limited: ponding, depth to saturated zone, flooding.	Very limited: depth to saturated zone, flooding, ponding.	Very limited: depth to saturated zone, ponding, flooding.	Very limited: ponding, flooding, depth to saturated zone.
SnlA:					
Southwest	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, ponding, restricted permeability.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
SwiA:					
Strole	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
SwxA:					
Sumava	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
TmaAN:					
Toto, drained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content.
TmaAU:					
Toto, undrained	Very limited: depth to saturated zone, ponding, content of organic matter, restricted permeability.	Very limited: ponding, depth to saturated zone, content of organic matter, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding, restricted permeability.	Very limited: depth to saturated zone, content of organic matter, ponding.	Very limited: ponding, content of organic matter, depth to saturated zone, carbonate content.
UbrA:					
Udorthents, clayey	Somewhat limited: restricted permeability.	Somewhat limited: restricted permeability.	Somewhat limited: restricted permeability.	Not limited	Somewhat limited: droughty.
W:					
Water	Not rated	Not rated	Not rated	Not rated	Not rated.
WmgA:					
Whiskerville	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
Bronson	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
WmiA:					
Whitepost	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
Gilford	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.
WoeB:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, slope.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
Crosier	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability.	Very limited: depth to saturated zone, restricted permeability, slope.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
WogA:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
WoxA:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
Winamac	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
WoxB:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, slope.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
Winamac	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, slope.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
WpaA:					
Winamac	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.

Table 14.--Recreation--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Lawns, landscaping, and golf fairways
WpaA:					
Bronson	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
WpbA:					
Winamac	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
WpbB:					
Winamac	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, slope.	Somewhat limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.
WrxAN:					
Wunabuna	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding.	Very limited: depth to saturated zone, ponding.	Very limited: ponding, depth to saturated zone.

Table 15.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AadAK:										
Abscota-----------	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
AatAN:										
Ackerman, drained	Poor	Poor	Poor	Good	Poor	Good	Good	Poor	Very poor.	Good.
AatAU:										
Ackerman, undrained--------	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Poor	Poor	Good
AbhAN:										
Adrian, drained---	Fair	Poor	Poor	Good	Poor	Good	Good	Poor	Very poor.	Good.
AbhAU:										
Adrian, undrained	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
ApuAN:										
Antung, drained---	Fair	Poor	Poor	Good	Poor	Good	Good	Poor	Very poor.	Good.
ApuAU:										
Antung, undrained	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
BrvA:										
Brady-------------	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
BstA:										
Brems-------------	Poor	Fair	Fair	Good	Poor	Poor	Very poor.	Fair	Poor	Very poor.
BstB:										
Brems-------------	Poor	Fair	Fair	Good	Poor	Poor	Very poor.	Fair	Poor	Very poor.
BswA:										
Brems-------------	Poor	Fair	Fair	Good	Poor	Poor	Very poor.	Fair	Poor	Very poor.
Morocco-----------	Poor	Fair	Good	Good	Fair	Fair	Very poor.	Fair	Fair	Poor.
BupB:										
Bronson-----------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BuuA:										
Brookston---------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
BuzA:										
Brookston---------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
Navunon-----------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.

Table 15.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
BwfA:										
Budd	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Brady	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
CjfC:										
Chelsea	Poor	Poor	Fair	Good	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CjfD:										
Chelsea	Poor	Poor	Fair	Good	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CmbAI:										
Cohoctah	Poor	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
CnzAI:										
Cohoctah	Poor	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
Abscota	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
CpcA:										
Conover	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CqmA:										
Corwin	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CuyA:										
Crosier	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
DbsA:										
Denham	Poor	Poor	Fair	Good	Poor	Poor	Poor	Poor	Poor	Poor.
DbsB:										
Denham	Poor	Poor	Fair	Good	Poor	Poor	Poor	Poor	Poor	Poor.
EchAN:										
Edwards, drained	Poor	Poor	Poor	Good	Poor	Good	Good	Poor	Very poor.	Good.
EchAU:										
Edwards, undrained	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
EcrAN:										
Edselton, drained	Poor	Poor	Poor	Good	Poor	Good	Good	Poor	Very poor.	Good.
EcrAU:										
Edselton, undrained	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
GcwA:										
Gilford	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
GdvA:										
Gilford	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
Monon	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Poor	Good.

Table 15.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
GmnA:										
Goodell-----------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Poor	Good.
Gilford-----------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
GrfA:										
Granby------------	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair.
GsaA:										
Granby------------	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair.
Gilford-----------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
HbzA:										
Headlee-----------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Brady-------------	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
HnbA:										
Homer-------------	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
HtbAN:										
Houghton, drained	Fair	Poor	Poor	Good	Poor	Good	Good	Poor	Very poor.	Good.
HtbAU:										
Houghton, undrained--------	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
MfrAN:										
Madaus, drained---	Poor	Poor	Poor	Good	Poor	Good	Good	Poor	Very poor.	Good.
MfrAU:										
Madaus, undrained	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
MgyA:										
Maumee------------	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair.
Gilford-----------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
MgzA:										
Maumee------------	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair.
Gumz--------------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Poor	Good.
MhaA:										
Maumee------------	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair.
MhbA:										
Maumee------------	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair.
MhnA:										
Medaryville-------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
MlwB:										
Metea-------------	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Moon--------------	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.

Table 15.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
MmyC2:										
Miami	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MnzB:										
Miami	Good	Good	Good	Good	Good	Very poor.	Poor	Good	Good	Very poor.
Williamstown	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MouA:										
Milford	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
MtoA:										
Moon	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Poor.
Ormas	Fair	Fair	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.
MtoB:										
Moon	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Poor.
Ormas	Fair	Fair	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.
MtpA:										
Moon	Fair	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Selfridge	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
MupA:										
Morocco	Poor	Fair	Good	Good	Fair	Fair	Very poor.	Fair	Fair	Poor.
MvhAN:										
Moston, drained	Poor	Poor	Poor	Good	Poor	Good	Good	Fair	Poor	Good.
MvhAU:										
Moston, undrained	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Good	Good	Poor	Poor	Good.
MwzAN:										
Muskego, drained	Poor	Poor	Poor	Good	Poor	Good	Good	Fair	Poor	Good.
MwzAU:										
Muskego, undrained	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Good	Good	Poor	Poor	Good.
NofA:										
Newton	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair.
Morocco	Poor	Fair	Good	Good	Fair	Fair	Very poor.	Fair	Fair	Poor.
OacA:										
Oakville	Poor	Poor	Fair	Good	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Denham	Poor	Poor	Fair	Good	Poor	Poor	Poor	Poor	Poor	Poor.

Table 15.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
OacB:										
Oakville----------	Poor	Poor	Fair	Good	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Denham------------	Poor	Poor	Fair	Good	Poor	Poor	Poor	Poor	Poor	Poor.
OaeC:										
Oakville----------	Poor	Poor	Fair	Good	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
OaeD:										
Oakville----------	Poor	Poor	Fair	Good	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
OeaA:										
Odell-------------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
OecA:										
Odell-------------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Francesville------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Pmg:										
Pits, gravel------	Very poor.	Very poor.	Poor	Good	Poor	Very poor.	Fair	Very poor.	Very poor.	Poor.
Pps:										
Pits, quarries, limestone.										
RebA:										
Radioville--------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
Mermill-----------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
RevA:										
Rensselaer--------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
Radioville--------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
ReyA:										
Rensselaer--------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
RhcA:										
Riddles-----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ScuA:										
Sebewa------------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
SdzcB:										
Selfridge---------	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
Brems-------------	Poor	Fair	Fair	Good	Poor	Poor	Very poor.	Fair	Poor	Very poor.
SgzA:										
Selfridge---------	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Fair.

Table 15.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
ShaA:										
Selfridge	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
Morocco	Poor	Fair	Good	Good	Fair	Fair	Very poor.	Fair	Fair	Poor.
SmsAK:										
Sloan	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
SnlA:										
Southwest	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
SwiA:										
Strole	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
SwxA:										
Sumava	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
TmaAN:										
Toto, drained	Poor	Poor	Poor	Good	Poor	Good	Good	Poor	Poor	Good.
TmaAU:										
Toto, undrained	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
UbrA:										
Udorthents, clayey	Fair	Good	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
W:										
Water.										
WmgA:										
Whiskerville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Bronson	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WmiA:										
Whitepost	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Poor	Good.
Gilford	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
WoeB:										
Williamstown	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Crosier	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WogA:										
Williamstown	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WoxA:										
Williamstown	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Winamac	Good	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
WoxB:										
Williamstown	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Winamac	Good	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.

Table 15.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WpaA:										
Winamac-----------	Good	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Bronson-----------	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WpbA:										
Winamac-----------	Good	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
WpbB:										
Winamac-----------	Good	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
WrxAN:										
Wunabuna----------	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.

Table 16.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
AadAK:					
Abscota	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone, flooding.
AatAN:					
Ackerman, drained	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
AatAU:					
Ackerman, undrained	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
AbhAN:					
Adrian, drained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.
AbhAU:					
Adrian, undrained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.
ApuAN:					
Antung, drained	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
ApuAU:					
Antung, undrained---	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
BrvA:					
Brady---------------	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
BstA:					
Brems---------------	Not limited---------	Very limited: depth to saturated zone.	Not limited---------	Not limited---------	Very limited: cutbanks cave, depth to saturated zone.
BstB:					
Brems---------------	Not limited---------	Very limited: depth to saturated zone.	Not limited---------	Not limited---------	Very limited: cutbanks cave, depth to saturated zone.
BswA:					
Brems---------------	Not limited---------	Very limited: depth to saturated zone.	Not limited---------	Not limited---------	Very limited: cutbanks cave, depth to saturated zone.
Morocco-------------	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, frost action.	Very limited: cutbanks cave, depth to saturated zone.
BupB:					
Bronson-------------	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
BuuA:					
Brookston	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone.
BuzA:					
Brookston	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone.
Navunon	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, depth to hard bedrock.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, depth to hard bedrock.
BwfA:					
Budd	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
Brady	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
CjfC:					
Chelsea	Somewhat limited: slope.	Somewhat limited: slope.	Very limited: slope.	Somewhat limited: slope.	Very limited: cutbanks cave, slope.
CjfD:					
Chelsea	Very limited: slope.	Very limited: slope.	Very limited: slope.	Very limited: slope.	Very limited: cutbanks cave, slope.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
CmbAI:					
Cohoctah	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: depth to saturated zone, frost action, flooding.	Very limited: depth to saturated zone, cutbanks cave, flooding.
CnzAI:					
Cohoctah	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: depth to saturated zone, frost action, flooding.	Very limited: depth to saturated zone, cutbanks cave, flooding.
Abscota	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: flooding, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone, flooding.
CpcA:					
Conover	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, shrink-swell.	Very limited: frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: depth to saturated zone, depth to dense layer.
CqmA:					
Corwin	Somewhat limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: low strength, depth to saturated zone, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.
CuyA:					
Crosier	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: depth to saturated zone, depth to dense layer.
DbsA:					
Denham	Not limited	Somewhat limited: depth to saturated zone.	Not limited	Not limited	Very limited: cutbanks cave, depth to saturated zone.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
DbsB:					
Denham	Not limited	Somewhat limited: depth to saturated zone.	Not limited	Not limited	Very limited: cutbanks cave, depth to saturated zone.
EchAN:					
Edwards, drained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, content of organic matter, cutbanks cave.
EchAU:					
Edwards, undrained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, content of organic matter, cutbanks cave.
EcrAN:					
Edselton, drained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.
EcrAU:					
Edselton, undrained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.
GcwA:					
Gilford	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
GdvA:					
Gilford	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Monon	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, depth to hard bedrock.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, depth to hard bedrock, cutbanks cave.
GmnA:					
Goodell	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Gilford	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.
GrfA:					
Granby	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
GsaA:					
Granby	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Gilford	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
HbzA:					
Headlee	Very limited: shrink-swell, depth to saturated zone.	Very limited: depth to saturated zone, shrink-swell.	Very limited: shrink-swell, depth to saturated zone.	Very limited: frost action, shrink-swell, depth to saturated zone, low strength.	Very limited: depth to saturated zone, cutbanks cave, depth to dense layer, too clayey.
Brady	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
HnbA:					
Homer	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
HtbAN:					
Houghton, drained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, content of organic matter, cutbanks cave.
HtbAU:					
Houghton, undrained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, content of organic matter, cutbanks cave.
MfrAN:					
Madaus, drained	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
MfrAU:					
Madaus, undrained---	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
MgyA:					
Maumee--------------	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Gilford-------------	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.
MgzA:					
Maumee--------------	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Gumz----------------	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
MhaA:					
Maumee--------------	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
MhbA:					
Maumee--------------	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
MhnA:					
Medaryville---------	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave, too clayey.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
MlwB:					
Metea	Not limited	Not limited	Not limited	Somewhat limited: frost action.	Very limited: cutbanks cave.
Moon	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
MmyC2:					
Miami	Somewhat limited: shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: slope, shrink-swell.	Very limited: low strength, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.
MnzB:					
Miami	Somewhat limited: shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Somewhat limited: shrink-swell.	Very limited: low strength, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.
Williamstown	Somewhat limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: low strength, depth to saturated zone, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.
MouA:					
Milford	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, frost action, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone.
MtoA:					
Moon	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
Ormas	Not limited	Not limited	Not limited	Somewhat limited: frost action.	Very limited: cutbanks cave.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
MtoB:					
Moon	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
Ormas	Not limited	Not limited	Not limited	Somewhat limited: frost action.	Very limited: cutbanks cave.
MtpA:					
Moon	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone.	Somewhat limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
Selfridge	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
MupA:					
Morocco	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, frost action.	Very limited: cutbanks cave, depth to saturated zone.
MvhAN:					
Moston, drained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter, shrink-swell.	Very limited: ponding, subsidence, depth to saturated zone, shrink-swell.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter, shrink-swell.	Very limited: ponding, depth to saturated zone, subsidence, frost action, low strength.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.
MvhAU:					
Moston, undrained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter, shrink-swell.	Very limited: ponding, subsidence, depth to saturated zone, shrink-swell.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter, shrink-swell.	Very limited: ponding, depth to saturated zone, subsidence, frost action, low strength.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
MwzAN:					
Muskego, drained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter, shrink-swell.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, content of organic matter.
MwzAU:					
Muskego, undrained	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter, shrink-swell.	Very limited: ponding, subsidence, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, subsidence, frost action.	Very limited: ponding, depth to saturated zone, content of organic matter.
NofA:					
Newton	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, frost action.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Morocco	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, frost action.	Very limited: cutbanks cave, depth to saturated zone.
OacA:					
Oakville	Not limited	Not limited	Not limited	Not limited	Very limited: cutbanks cave.
Denham	Not limited	Somewhat limited: depth to saturated zone.	Not limited	Not limited	Very limited: cutbanks cave, depth to saturated zone.
OacB:					
Oakville	Not limited	Not limited	Not limited	Not limited	Very limited: cutbanks cave.
Denham	Not limited	Somewhat limited: depth to saturated zone.	Not limited	Not limited	Very limited: cutbanks cave, depth to saturated zone.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
OaeC:					
Oakville	Not limited	Not limited	Very limited: slope.	Not limited	Very limited: cutbanks cave.
OaeD:					
Oakville	Very limited: slope.	Very limited: slope.	Very limited: slope.	Very limited: slope.	Very limited: cutbanks cave, slope.
OeaA:					
Odell	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: depth to saturated zone, depth to dense layer.
OecA:					
Odell	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: depth to saturated zone, depth to dense layer.
Francesville	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell, depth to hard bedrock.	Very limited: depth to saturated zone, shrink-swell.	Very limited: frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: depth to saturated zone, depth to dense layer, depth to hard bedrock.
Pmg:					
Pits, gravel	Not rated	Not rated	Not rated	Not rated	Not rated.
Pps:					
Pits, quarries, limestone	Not rated	Not rated	Not rated	Not rated	Not rated.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
RebA:					
Radioville	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Mermill	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, frost action, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone.
RevA:					
Rensselaer	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone, cutbanks cave.
Radioville	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone, cutbanks cave.
ReyA:					
Rensselaer	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone, cutbanks cave.
RhcA:					
Riddles	Not limited	Not limited	Not limited	Somewhat limited: low strength, frost action.	Not limited.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
ScuA:					
Sebewa	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, frost action, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, cutbanks cave.
SdzcB:					
Selfridge	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
Brems	Not limited	Very limited: depth to saturated zone.	Not limited	Not limited	Very limited: cutbanks cave, depth to saturated zone.
SgzA:					
Selfridge	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
ShaA:					
Selfridge	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave.
Morocco	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, frost action.	Very limited: cutbanks cave, depth to saturated zone.
SmsAK:					
Sloan	Very limited: ponding, flooding, depth to saturated zone, shrink-swell.	Very limited: ponding, flooding, depth to saturated zone, shrink-swell.	Very limited: ponding, flooding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, frost action, flooding, low strength.	Very limited: ponding, depth to saturated zone, cutbanks cave, flooding.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
SnlA:					
Southwest	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, frost action, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone.
SwiA:					
Strole	Very limited: shrink-swell, depth to saturated zone.	Very limited: depth to saturated zone, shrink-swell.	Very limited: shrink-swell, depth to saturated zone.	Very limited: frost action, low strength, shrink-swell, depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
SwxA:					
Sumava	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, frost action.	Very limited: depth to saturated zone.
TmaAN:					
Toto, drained	Very limited: ponding, depth to saturated zone, content of organic matter, subsidence.	Very limited: ponding, depth to saturated zone, subsidence.	Very limited: ponding, depth to saturated zone, content of organic matter, subsidence.	Very limited: ponding, depth to saturated zone, frost action, subsidence.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.
TmaAU:					
Toto, undrained	Very limited: ponding, depth to saturated zone, content of organic matter, subsidence.	Very limited: ponding, depth to saturated zone, subsidence.	Very limited: ponding, depth to saturated zone, content of organic matter, subsidence.	Very limited: ponding, depth to saturated zone, frost action, subsidence.	Very limited: ponding, depth to saturated zone, cutbanks cave, content of organic matter.
UbrA:					
Udorthents, clayey	Somewhat limited: shrink-swell.	Somewhat limited: shrink-swell.	Somewhat limited: shrink-swell.	Very limited: low strength, shrink-swell, frost action.	Somewhat limited: depth to dense layer, cutbanks cave.
W:					
Water	Not rated	Not rated	Not rated	Not rated	Not rated.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
WmgA:					
Whiskerville	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: depth to saturated zone, cutbanks cave, too clayey.
Bronson	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
WmiA:					
Whitepost	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave, too clayey.
Gilford	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, frost action, depth to saturated zone.	Very limited: ponding, depth to saturated zone, cutbanks cave.
WoeB:					
Williamstown	Somewhat limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: low strength, depth to saturated zone, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.
Crosier	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: frost action, depth to saturated zone, low strength, shrink-swell.	Very limited: depth to saturated zone, depth to dense layer.
WogA:					
Williamstown	Somewhat limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: low strength, depth to saturated zone, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
WoxA:					
Williamstown	Somewhat limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: low strength, depth to saturated zone, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.
Winamac	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
WoxB:					
Williamstown	Somewhat limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: depth to saturated zone, shrink-swell.	Very limited: low strength, depth to saturated zone, shrink-swell, frost action.	Very limited: depth to saturated zone, depth to dense layer.
Winamac	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
WpaA:					
Winamac	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
Bronson	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
WpbA:					
Winamac	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.

Table 16.--Building Site Development--Continued

Map symbol and soil name	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Shallow excavations
WpbB:					
Winamac-------------	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: frost action, depth to saturated zone.	Very limited: cutbanks cave, depth to saturated zone.
WrxAN:					
Wunabuna------------	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, content of organic matter.	Very limited: ponding, depth to saturated zone, shrink-swell.	Very limited: ponding, depth to saturated zone, frost action, low strength, shrink-swell.	Very limited: ponding, depth to saturated zone, content of organic matter, too clayey, cutbanks cave.

Table 17.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AadAK:					
Abscota	Very limited: flooding, depth to saturated zone, filtering capacity.	Very limited: flooding, seepage, depth to saturated zone.	Very limited: flooding, depth to saturated zone, seepage, too sandy.	Very limited: flooding, depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
AatAN:					
Ackerman, drained	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
AatAU:					
Ackerman, undrained	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
AbhAN:					
Adrian, drained	Very limited: ponding, depth to saturated zone, filtering capacity, subsidence.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
AbhAU:					
Adrian, undrained	Very limited: ponding, depth to saturated zone, filtering capacity, subsidence.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
ApuAN:					
Antung, drained	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ApuAU:					
Antung, undrained	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
BrvA:					
Brady	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
BstA:					
Brems	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
BstB:					
Brems	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone, slope.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
BswA:					
Brems	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
Morocco	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
BupB:					
Bronson	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone, slope.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BuuA:					
Brookston	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too clayey.
BuzA:					
Brookston	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too clayey.
Navunon	Very limited: restricted permeability, ponding, depth to saturated zone, depth to bedrock.	Very limited: ponding, depth to saturated zone, seepage, depth to hard bedrock.	Very limited: depth to saturated zone, ponding, depth to bedrock.	Very limited: ponding, depth to saturated zone, depth to bedrock.	Very limited: ponding, depth to saturated zone, depth to bedrock.
BwfA:					
Budd	Very limited: depth to saturated zone, filtering capacity, restricted permeability.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
Brady	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
CjfC:					
Chelsea	Very limited: filtering capacity, slope.	Very limited: seepage, slope.	Very limited: seepage, too sandy, slope.	Very limited: seepage, slope.	Very limited: too sandy, seepage, slope.
CjfD:					
Chelsea	Very limited: filtering capacity, slope.	Very limited: slope, seepage.	Very limited: seepage, too sandy, slope.	Very limited: seepage, slope.	Very limited: too sandy, seepage, slope.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CmbAI:					
Cohoctah	Very limited: flooding, depth to saturated zone, filtering capacity.	Very limited: flooding, seepage, depth to saturated zone.	Very limited: flooding, depth to saturated zone, seepage.	Very limited: flooding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
CnzAI:					
Cohoctah	Very limited: flooding, depth to saturated zone, filtering capacity.	Very limited: flooding, seepage, depth to saturated zone.	Very limited: flooding, depth to saturated zone, seepage.	Very limited: flooding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
Abscota	Very limited: flooding, depth to saturated zone, filtering capacity.	Very limited: flooding, seepage, depth to saturated zone.	Very limited: flooding, depth to saturated zone, seepage, too sandy.	Very limited: flooding, depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
CpcA:					
Conover	Very limited: restricted permeability, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.
CqmA:					
Corwin	Very limited: depth to saturated zone, restricted permeability.	Somewhat limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
CuyA:					
Crosier	Very limited: depth to saturated zone, restricted permeability.	Somewhat limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
DbsA:					
Denham	Very limited: filtering capacity, depth to saturated zone.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DbsB:					
Denham	Very limited: filtering capacity, depth to saturated zone.	Very limited: seepage, depth to saturated zone, slope.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
EchAN:					
Edwards, drained	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, content of organic matter, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, carbonate content, content of organic matter.
EchAU:					
Edwards, undrained	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, content of organic matter, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, carbonate content, content of organic matter.
EcrAN:					
Edselton, drained	Very limited: restricted permeability, ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, carbonate content.
EcrAU:					
Edselton, undrained	Very limited: restricted permeability, ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, carbonate content.
GcwA:					
Gilford	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GdvA:					
Gilford	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
Monon	Very limited: ponding, depth to saturated zone, depth to bedrock.	Very limited: ponding, seepage, depth to saturated zone, depth to hard bedrock.	Very limited: depth to saturated zone, ponding, depth to bedrock.	Very limited: ponding, depth to saturated zone, seepage, depth to bedrock.	Very limited: ponding, depth to saturated zone, seepage, depth to bedrock.
GmnA:					
Goodell	Very limited: ponding, depth to saturated zone, filtering capacity, restricted permeability.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, seepage, too sandy.
Gilford	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
GrfA:					
Granby	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
GsaA:					
Granby	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GsaA:					
Gilford	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
HbzA:					
Headlee	Very limited: restricted permeability, depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, hard to compact.
Brady	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
HnbA:					
Homer	Very limited: depth to saturated zone, filtering capacity, restricted permeability.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
HtbAN:					
Houghton, drained	Very limited: ponding, depth to saturated zone, subsidence.	Very limited: ponding, content of organic matter, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, content of organic matter, seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, content of organic matter, seepage.
HtbAU:					
Houghton, undrained	Very limited: ponding, depth to saturated zone, subsidence.	Very limited: ponding, content of organic matter, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, content of organic matter, seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, content of organic matter, seepage.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MfrAN:					
Madaus, drained	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, carbonate content.
MfrAU:					
Madaus, undrained	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, carbonate content.
MgyA:					
Maumee	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
Gilford	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
MgzA:					
Maumee	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
Gumz	Very limited: ponding, depth to saturated zone, filtering capacity, restricted permeability.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MhaA:					
Maumee	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
MhbA:					
Maumee	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
MhnA:					
Medaryville	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too clayey, hard to compact.
MlwB:					
Metea	Very limited: filtering capacity, restricted permeability.	Very limited: seepage, slope.	Not limited	Very limited: seepage.	Not limited.
Moon	Very limited: depth to saturated zone, restricted permeability.	Very limited: seepage, depth to saturated zone, slope.	Somewhat limited: depth to saturated zone, depth to saturated zone.	Very limited: seepage, depth to saturated zone, depth to saturated zone.	Somewhat limited: depth to saturated zone.
MmyC2:					
Miami	Very limited: depth to saturated zone.	Very limited: slope, depth to saturated zone, seepage.	Somewhat limited: depth to saturated zone, too clayey.	Somewhat limited: depth to saturated zone.	Somewhat limited: too clayey, depth to saturated zone.
MnzB:					
Miami	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, seepage, slope.	Somewhat limited: depth to saturated zone, too clayey.	Somewhat limited: depth to saturated zone.	Somewhat limited: too clayey, depth to saturated zone.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MnzB:					
Williamstown--------	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, seepage, slope.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
MouA:					
Milford-------------	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too clayey, hard to compact.
MtoA:					
Moon----------------	Very limited: depth to saturated zone, restricted permeability.	Very limited: seepage, depth to saturated zone.	Somewhat limited: depth to saturated zone, depth to saturated zone.	Very limited: seepage, depth to saturated zone, depth to saturated zone.	Somewhat limited: depth to saturated zone.
Ormas---------------	Very limited: filtering capacity.	Very limited: seepage.	Very limited: seepage, too sandy.	Very limited: seepage.	Very limited: too sandy, seepage.
MtoB:					
Moon----------------	Very limited: depth to saturated zone, restricted permeability.	Very limited: seepage, depth to saturated zone, slope.	Somewhat limited: depth to saturated zone, depth to saturated zone.	Very limited: seepage, depth to saturated zone, depth to saturated zone.	Somewhat limited: depth to saturated zone.
Ormas---------------	Very limited: filtering capacity.	Very limited: seepage, slope.	Very limited: seepage, too sandy.	Very limited: seepage.	Very limited: too sandy, seepage.
MtpA:					
Moon----------------	Very limited: depth to saturated zone, restricted permeability.	Very limited: seepage, depth to saturated zone.	Somewhat limited: depth to saturated zone, depth to saturated zone.	Very limited: seepage, depth to saturated zone, depth to saturated zone.	Somewhat limited: depth to saturated zone.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MtpA:					
Selfridge	Very limited: depth to saturated zone, restricted permeability, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.
MupA:					
Morocco	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
MvhAN:					
Moston, drained	Very limited: restricted permeability, ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, content of organic matter.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone.
MvhAU:					
Moston, undrained	Very limited: restricted permeability, ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, content of organic matter.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone.
MwzAN:					
Muskego, drained	Very limited: restricted permeability, ponding, depth to saturated zone, subsidence.	Very limited: ponding, depth to saturated zone, seepage, content of organic matter.	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, hard to compact.
MwzAU:					
Muskego, undrained	Very limited: restricted permeability, ponding, depth to saturated zone, subsidence.	Very limited: ponding, depth to saturated zone, seepage, content of organic matter.	Very limited: depth to saturated zone, ponding, content of organic matter.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, hard to compact.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NofA:					
Newton	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
Morocco	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
OacA:					
Oakville	Very limited: filtering capacity.	Very limited: seepage.	Very limited: seepage, too sandy.	Very limited: seepage.	Very limited: too sandy, seepage.
Denham	Very limited: filtering capacity, depth to saturated zone.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
OacB:					
Oakville	Very limited: filtering capacity.	Very limited: seepage, slope.	Very limited: seepage, too sandy.	Very limited: seepage.	Very limited: too sandy, seepage.
Denham	Very limited: filtering capacity, depth to saturated zone.	Very limited: seepage, depth to saturated zone, slope.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
OaeC:					
Oakville	Very limited: filtering capacity.	Very limited: seepage, slope.	Very limited: seepage, too sandy.	Very limited: seepage.	Very limited: too sandy, seepage.
OaeD:					
Oakville	Very limited: filtering capacity, slope.	Very limited: slope, seepage.	Very limited: seepage, too sandy, slope.	Very limited: seepage, slope.	Very limited: too sandy, seepage, slope.
OeaA:					
Odell	Very limited: depth to saturated zone, restricted permeability.	Somewhat limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OecA:					
Odell	Very limited: depth to saturated zone, restricted permeability.	Somewhat limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
Francesville	Very limited: depth to saturated zone, depth to bedrock, restricted permeability.	Somewhat limited: seepage, depth to saturated zone, depth to hard bedrock.	Very limited: depth to bedrock, depth to saturated zone, too clayey.	Very limited: depth to saturated zone, depth to bedrock.	Very limited: depth to saturated zone, too clayey, depth to bedrock.
Pmg:					
Pits, gravel	Not rated	Not rated	Not rated	Not rated	Not rated.
Pps:					
Pits, quarries, limestone	Not rated	Not rated	Not rated	Not rated	Not rated.
RebA:					
Radioville	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, hard to compact, too clayey.
Mermill	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too clayey, hard to compact.
RevA:					
Rensselaer	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too sandy.
Radioville	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, hard to compact, too clayey.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ReyA:					
Rensselaer	Very limited: restricted permeability, ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too sandy.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too sandy.
RhcA:					
Riddles	Very limited: restricted permeability.	Somewhat limited: seepage.	Not limited	Not limited	Not limited.
ScuA:					
Sebewa	Very limited: ponding, depth to saturated zone, filtering capacity, restricted permeability.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage, gravel content.
SdzcB:					
Selfridge	Very limited: depth to saturated zone, restricted permeability, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.
Brems	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone, slope.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
SgzA:					
Selfridge	Very limited: depth to saturated zone, restricted permeability, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ShaA:					
Selfridge-----------	Very limited: depth to saturated zone, restricted permeability, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.
Morocco-------------	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage, too sandy.	Very limited: depth to saturated zone, seepage.	Very limited: too sandy, seepage, depth to saturated zone.
SmsAK:					
Sloan---------------	Very limited: flooding, ponding, depth to saturated zone, restricted permeability.	Very limited: ponding, flooding, depth to saturated zone, seepage.	Very limited: flooding, depth to saturated zone, ponding, too clayey.	Very limited: flooding, ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too clayey.
SnlA:					
Southwest-----------	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone.	Very limited: ponding, depth to saturated zone, too clayey.
SwiA:					
Strole--------------	Very limited: restricted permeability, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: too clayey, depth to saturated zone, hard to compact.
SwxA:					
Sumava--------------	Very limited: depth to saturated zone, restricted permeability, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TmaAN:					
Toto, drained	Very limited: restricted permeability, ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
TmaAU:					
Toto, undrained	Very limited: restricted permeability, ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone, content of organic matter.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
UbrA:					
Udorthents, clayey	Very limited: restricted permeability.	Not limited	Somewhat limited: too clayey.	Not limited	Somewhat limited: too clayey.
W:					
Water	Not rated	Not rated	Not rated	Not rated	Not rated.
WmgA:					
Whiskerville	Very limited: restricted permeability, depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: hard to compact, depth to saturated zone, seepage.
Bronson	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
WmiA:					
Whitepost	Very limited: restricted permeability, ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, too clayey.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too clayey.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WmiA:					
Gilford	Very limited: ponding, depth to saturated zone, filtering capacity.	Very limited: ponding, seepage, depth to saturated zone.	Very limited: depth to saturated zone, ponding, seepage, too sandy.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, too sandy, seepage.
WoeB:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, seepage, slope.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
Crosier	Very limited: depth to saturated zone, restricted permeability.	Somewhat limited: depth to saturated zone, slope.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
WogA:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
WoxA:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
Winamac	Very limited: depth to saturated zone, filtering capacity, restricted permeability.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
WoxB:					
Williamstown	Very limited: depth to saturated zone.	Somewhat limited: depth to saturated zone, seepage, slope.	Very limited: depth to saturated zone, too clayey.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, too clayey.
Winamac	Very limited: depth to saturated zone, filtering capacity, restricted permeability.	Very limited: seepage, depth to saturated zone, slope.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.

Table 17.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoons	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WpaA:					
Winamac-------------	Very limited: depth to saturated zone, filtering capacity, restricted permeability.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
Bronson-------------	Very limited: depth to saturated zone, filtering capacity.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
WpbA:					
Winamac-------------	Very limited: depth to saturated zone, filtering capacity, restricted permeability.	Very limited: seepage, depth to saturated zone.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
WpbB:					
Winamac-------------	Very limited: depth to saturated zone, filtering capacity, restricted permeability.	Very limited: seepage, depth to saturated zone, slope.	Very limited: depth to saturated zone.	Very limited: depth to saturated zone, seepage.	Very limited: depth to saturated zone, seepage.
WrxAN:					
Wunabuna------------	Very limited: ponding, depth to saturated zone, restricted permeability.	Very limited: ponding, depth to saturated zone, seepage, content of organic matter.	Very limited: depth to saturated zone, ponding, content of organic matter, seepage.	Very limited: ponding, depth to saturated zone, seepage.	Very limited: ponding, depth to saturated zone, content of organic matter, seepage.

Table 18.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AadAK:				
Abscota	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
AatAN:				
Ackerman, drained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
AatAU:				
Ackerman, undrained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
AbhAN:				
Adrian, drained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
AbhAU:				
Adrian, undrained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
ApuAN:				
Antung, drained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
ApuAU:				
Antung, undrained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
BrvA:				
Brady	Fair: wetness.	Probable	Probable	Poor: small stones.
BstA:				
Brems	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
BstB:				
Brems	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
BswA:				
Brems	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Morocco	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
BupB:				
Bronson	Fair: wetness.	Probable	Improbable: too sandy.	Fair: area reclaim, small stones.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
BuuA:				
Brookston	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BuzA:				
Brookston	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Navunon	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BwfA:				
Budd	Fair: wetness.	Probable	Improbable: excess fines.	Fair: small stones.
Brady	Fair: wetness.	Probable	Probable	Poor: small stones.
CjfC:				
Chelsea	Good	Probable	Improbable: too sandy.	Poor: too sandy.
CjfD:				
Chelsea	Fair: slope.	Probable	Improbable: too sandy.	Poor: slope, too sandy.
CmbAI:				
Cohoctah	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
CnzAI:				
Cohoctah	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Abscota	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
CpcA:				
Conover	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
CqmA:				
Corwin	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
CuyA:				
Crosier	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
DbsA:				
Denham	Good	Probable	Improbable: too sandy.	Poor: too sandy.
DbsB:				
Denham	Good	Probable	Improbable: too sandy.	Poor: too sandy.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
EchAN:				
Edwards, drained---	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
EchAU:				
Edwards, undrained	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
EcrAN:				
Edselton, drained--	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: excess humus, wetness.
EcrAU:				
Edselton, undrained	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: excess humus, wetness.
GcwA:				
Gilford------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: wetness.
GdvA:				
Gilford------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: wetness.
Monon--------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
GmnA:				
Goodell------------	Poor: wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: wetness.
Gilford------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: wetness.
GrfA:				
Granby-------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
GsaA:				
Granby-------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
Gilford------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: wetness.
HbzA:				
Headlee------------	Poor: shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer, too clayey.
Brady--------------	Fair: wetness.	Probable------------	Probable------------	Poor: small stones.
HnbA:				
Homer--------------	Fair: wetness.	Probable------------	Probable------------	Poor: area reclaim, small stones.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
HtbAN:				
Houghton, drained	Poor: low strength, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
HtbAU:				
Houghton, undrained	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
MfrAN:				
Madaus, drained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
MfrAU:				
Madaus, undrained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
MgyA:				
Maumee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Gilford	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
MgzA:				
Maumee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Gumz	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
MhaA:				
Maumee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
MhbA:				
Maumee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
MhnA:				
Medaryville	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Fair: small stones, thin layer.
MlwB:				
Metea	Fair: thin layer.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
Moon	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
MmyC2:				
Miami	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
MnzB:				
Miami	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
Williamstown	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
MouA:				
Milford	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
MtoA:				
Moon	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
Ormas	Good	Probable	Probable	Poor: area reclaim, too sandy.
MtoB:				
Moon	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
Ormas	Good	Probable	Probable	Poor: area reclaim, too sandy.
MtpA:				
Moon	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
Selfridge	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
MupA:				
Morocco	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
MvhAN:				
Moston, drained	Poor: low strength, wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
MvhAU:				
Moston, undrained	Poor: low strength, wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
MwzAN:				
Muskego, drained	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
MwzAU:				
Muskego, undrained	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
NofA:				
Newton	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Morocco	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
OacA:				
Oakville	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Denham	Good	Probable	Improbable: too sandy.	Poor: too sandy.
OacB:				
Oakville	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Denham	Good	Probable	Improbable: too sandy.	Poor: too sandy.
OaeC:				
Oakville	Good	Probable	Improbable: too sandy.	Poor: too sandy.
OaeD:				
Oakville	Fair: slope.	Probable	Improbable: too sandy.	Poor: slope, too sandy.
OeaA:				
Odell	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
OecA:				
Odell	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
Francesville	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
Pmg:				
Pits, gravel	Fair: slope.	Probable	Probable	Poor: area reclaim, small stones, too sandy.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Pps:				
Pits, quarries, limestone.				
RebA:				
Radioville	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Mermill	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RevA:				
Rensselaer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Radioville	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
ReyA:				
Rensselaer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RhcA:				
Riddles	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
ScuA:				
Sebewa	Poor: wetness.	Probable	Probable	Poor: area reclaim, small stones, wetness.
SdzcB:				
Selfridge	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
Brems	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
SgzA:				
Selfridge	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
ShaA:				
Selfridge	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: too sandy.
Morocco	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
SmsAK:				
Sloan	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
SnlA:				
Southwest	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
SwiA:				
Strole	Poor: shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
SwxA:				
Sumava	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
TmaAN:				
Toto, drained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
TmaAU:				
Toto, undrained	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
UbrA:				
Udorthents, clayey	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
W:				
Water.				
WmgA:				
Whiskerville	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Bronson	Fair: wetness.	Probable	Improbable: too sandy.	Fair: area reclaim, small stones.
WmiA:				
Whitepost	Poor: wetness.	Improbable: thin layer.	Improbable: excess fines.	Poor: wetness.
Gilford	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
WoeB:				
Williamstown	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
Crosier	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
WogA:				
Williamstown	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.

Table 18.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
WoxA:				
Williamstown	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
Winamac	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Fair: small stones.
WoxB:				
Williamstown	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, too clayey.
Winamac	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Fair: small stones.
WpaA:				
Winamac	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Fair: small stones.
Bronson	Fair: wetness.	Probable	Improbable: too sandy.	Fair: area reclaim, small stones.
WpbA:				
Winamac	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Fair: small stones.
WpbB:				
Winamac	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: excess fines.	Fair: small stones.
WrxAN:				
Wunabuna	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness.

Table 19.--Engineering Index Properties

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
AadAK:												
Abscota---------	0-5	Fine sandy loam--	SC-SM, SM	A-2-4, A-4	0	0	95-100	90-100	85-95	30-45	15-30	NP-10
	5-14	Sand, loamy fine sand, loamy sand.	SM	A-1, A-2-4, A-3	0	0	95-100	85-100	45-65	5-30	0-0	NP
	14-60	Sand, coarse sand, gravelly sand.	SM, SP, SP-SM	A-2-4, A-1, A-3	0	0	85-100	60-100	35-55	0-15	0-0	NP
AatAN:												
Ackerman, drained--------	0-8	Muck------------	PT	A-8	---	---	---	---	---	---	---	---
	8-14	Coprogenous material.	OL	A-8	---	---	---	---	---	---	40-50	2-8
	14-80	Fine sand, very fine sand, loamy sand.	SM, SP-SM	A-2-4	0	0	100	100	85-95	10-20	0-0	NP
AatAU:												
Ackerman, undrained------	0-8	Muck------------	PT	A-8	---	---	---	---	---	---	---	---
	8-14	Coprogenous material.	OL	A-8	---	---	---	---	---	---	40-50	2-8
	14-80	Fine sand, very fine sand, loamy sand.	SM, SP-SM	A-2-4	0	0	100	100	85-95	10-20	0-0	NP
AbhAN:												
Adrian, drained	0-9	Muck------------	PT	A-8	---	---	---	---	---	---	---	---
	9-34	Muck------------	PT	A-8	---	---	---	---	---	---	---	---
	34-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-1, A-2, A-3	0	0	80-100	60-100	30-80	0-35	0-0	NP
AbhAU:												
Adrian, undrained------	0-34	Muck------------	PT	A-8	---	---	---	---	---	---	---	---
	34-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-1, A-3, A-2	0	0	80-100	60-100	30-80	0-35	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ApuAN:												
Antung, drained	0-9	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	9-12	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	12-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-1, A-2, A-3	0	0	80-100	60-100	30-80	0-35	0-14	NP
ApuAU:												
Antung, undrained------	0-12	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	12-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-1, A-2, A-3	0	0	80-100	60-100	30-80	0-35	0-14	NP
BrvA:												
Brady-----------	0-13	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	80-90	35-60	15-25	NP-10
	13-56	Sandy clay loam, sandy loam, gravelly sandy loam.	SC, SC-SM	A-6, A-1, A-4, A-2	0	0-5	80-100	75-98	35-90	20-55	20-30	NP-11
	56-80	Gravelly sand, coarse sand, gravel.	GP, GP-GM, SP-SM, SP	A-2-4, A-1, A-3	0-1	0-5	45-100	25-98	10-80	0-15	0-0	NP
BstA:												
Brems-----------	0-9	Loamy fine sand--	SM	A-2-4, A-3	0	0	100	100	90-100	5-35	0-0	NP
	9-72	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP
	72-80	Sand, fine sand, loamy sand.	SP, SM, SP-SM	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP
BstB:												
Brems-----------	0-9	Loamy fine sand--	SM	A-2-4, A-3	0	0	100	100	90-100	5-35	0-0	NP
	9-72	Sand, fine sand, loamy sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP
	72-80	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP
BswA:												
Brems-----------	0-9	Loamy fine sand--	SM	A-2-4, A-3	0	0	100	100	90-100	5-35	0-0	NP
	9-72	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP
	72-80	Sand, fine sand, loamy sand.	SP, SM, SP-SM	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
BswA:												
Morocco---------	0-9	Loamy fine sand--	SM, SP-SM	A-2-4	0	0	100	98-100	75-95	0-25	0-0	NP
	9-60	Fine sand, sand, loamy fine sand, loamy sand.	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	60-80	Fine sand, sand--	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
BupB:												
Bronson---------	0-9	Fine sandy loam--	SC-SM, SM, SC	A-4	0	0	95-100	90-100	85-90	35-60	15-30	NP-10
	9-20	Sandy loam-------	SC-SM, SM	A-2, A-4	0	0-5	95-100	90-100	55-70	25-40	15-25	NP-7
	20-43	Sandy loam, sandy clay loam, gravelly sandy loam.	SC, SC-SM	A-6, A-4, A-1, A-2	0	0-5	80-95	60-90	35-85	20-50	20-30	4-11
	43-56	Loamy sand, gravelly loamy sand.	SM, SP-SM	A-1, A-2	0	0-5	80-95	60-90	30-70	10-25	15-20	NP-4
	56-80	Sand, gravelly sand, coarse sand.	SP, SP-SM	A-2, A-1, A-3	0	0-10	80-95	65-90	30-75	0-10	0-0	NP
BuuA:												
Brookston-------	0-9	Loam-------------	CL-ML, CL, ML	A-4, A-6	0	0	95-100	90-100	85-95	55-75	20-40	NP-17
	9-48	Clay loam, silty clay loam, loam.	CL	A-6, A-7-6	0	0	98-100	85-100	75-100	55-90	25-50	12-33
	48-68	Loam, fine sandy loam.	CL, CL-ML, SC, ML	A-4, A-6	0-1	0-3	90-100	85-100	65-95	40-70	15-40	NP-22
	68-80	Loam, fine sandy loam.	CL, CL-ML, ML, SC, SM	A-4, A-6	0-1	0-3	90-100	85-100	65-90	40-70	15-30	NP-15
BuzA:												
Brookston-------	0-9	Loam-------------	CL, ML, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	55-75	20-40	NP-17
	9-48	Clay loam, silty clay loam, loam.	CL	A-6, A-7-6	0	0	98-100	85-100	75-100	55-90	25-50	12-33
	48-68	Loam, fine sandy loam.	CL, CL-ML, SC, ML	A-4, A-6	0-1	0-3	90-100	85-100	65-95	40-70	15-40	NP-22
	68-80	Loam, fine sandy loam.	SC, SM, CL, CL-ML, ML	A-4, A-6	0-1	0-3	90-100	85-100	65-90	40-70	15-30	NP-15
Navunon---------	0-9	Loam-------------	CL, ML, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	55-75	20-40	NP-17
	9-24	Sandy clay loam, loam, clay loam, silty clay loam.	CL	A-6, A-7-6	0	0	98-100	85-100	75-100	55-90	25-50	12-33
	24-43	Loam, fine sandy loam.	CL, CL-ML, SC, ML, SM	A-4, A-6	0-1	0-3	90-100	85-100	65-90	40-70	15-30	NP-15
	43-80	Bedrock----------	---	---	---	---	---	---	---	---	---	---

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
BwfA:												
Budd------------	0-15	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-100	85-90	35-60	15-30	NP-10
	15-38	Fine sandy loam, sandy loam, gravelly sandy loam.	SC, SC-SM, SM	A-2-4, A-4	0	0-5	80-100	75-98	55-85	25-55	0-30	NP-10
	38-52	Stratified loamy sand to sand to very fine sand to gravelly sand to silt loam.	GP-GM, GP, SP, ML, SP-SM	A-1, A-2-4, A-6, A-3, A-4	0-1	0-5	80-100	75-98	45-80	0-65	0-40	NP-15
	52-80	Loam, fine sandy loam.	CL, SM, CL-ML, SC, ML	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
Brady-----------	0-13	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	80-90	35-60	15-25	NP-10
	13-56	Sandy clay loam, sandy loam, gravelly sandy loam.	SC, SC-SM	A-6, A-4, A-1, A-2	0	0-5	80-100	75-98	35-90	20-55	20-30	NP-11
	56-80	Gravelly sand, coarse sand, gravel.	GP, GP-GM, SP-SM, SP	A-1, A-2-4, A-3	0-1	0-5	45-100	25-98	10-80	0-15	0-0	NP
CjfC:												
Chelsea---------	0-5	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	75-95	0-25	0-0	NP
	5-37	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	75-95	0-25	0-0	NP
	37-80	Fine sand, sand, loamy fine sand.	SM, SP-SM, SP	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
CjfD:												
Chelsea---------	0-5	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	75-95	0-25	0-0	NP
	5-37	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	75-95	0-25	0-0	NP
	37-80	Fine sand, sand, loamy fine sand.	SM, SP-SM, SP	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
CmbAI:												
Cohoctah--------	0-13	Loam-------------	CL, CL-ML	A-4	0	0	100	100	85-100	25-80	20-40	5-25
	13-56	Loam, fine sandy loam, sandy loam.	CL-ML, SC, CL, SC-SM	A-2-4, A-4	0	0	100	100	85-100	25-80	10-40	NP-25
	56-80	Sand, coarse sand, loamy sand.	SP, SM, SP-SM	A-1-b, A-3, A-2-4	0	0	85-100	75-98	35-85	0-25	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
CnzAI:												
Cohoctah--------	0-13	Loam------------	CL, CL-ML	A-4	0	0	100	100	85-100	25-80	20-40	5-25
	13-56	Loam, fine sandy loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2-4, A-4	0	0	100	100	85-100	25-80	10-40	NP-25
	56-80	Sand, coarse sand, loamy sand.	SM, SP, SP-SM	A-1-b, A-3, A-2-4	0	0	85-100	75-98	35-85	0-25	0-0	NP
Abscota---------	0-5	Fine sandy loam--	SC-SM, SM	A-2-4, A-4	0	0	95-100	90-100	85-95	30-45	15-30	NP-10
	5-14	Sand, loamy fine sand, loamy sand.	SM	A-2-4, A-1, A-3	0	0	95-100	85-100	45-65	5-30	0-0	NP
	14-60	Sand, coarse sand, gravelly sand.	SM, SP, SP-SM	A-2-4, A-1, A-3	0	0	85-100	60-100	35-55	0-15	0-0	NP
CpcA:												
Conover---------	0-11	Loam------------	CL, CL-ML, ML	A-4, A-6	0	0	95-100	90-100	85-95	55-70	15-40	NP-15
	11-27	Clay loam--------	CL	A-6, A-7-6	0	0-1	95-100	90-100	85-95	55-80	30-50	10-30
	27-60	Loam, fine sandy loam.	CL, SM, CL-ML, SC, ML	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-40	NP-25
CqmA:												
Corwin----------	0-11	Fine sandy loam--	CL-ML, SC-SM, CL, SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	11-30	Clay loam, loam--	CL, CL-ML	A-6, A-4, A-7-6	0	0	95-100	90-100	85-95	55-85	20-50	5-30
	30-80	Loam------------	CL, ML, CL-ML	A-4, A-6	0-1	0-3	90-100	85-100	75-95	45-85	15-40	NP-20
CuyA:												
Crosier---------	0-11	Fine sandy loam--	CL, CL-ML, SM, SC-SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	11-30	Clay loam, loam, sandy clay loam.	CL, CL-ML, SC	A-6, A-7	0	0-1	90-100	90-100	75-95	45-80	20-50	5-30
	30-80	Loam, sandy loam	CL, CL-ML, SM, ML, SC	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
DbsA:												
Denham----------	0-9	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	9-49	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	49-80	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-100	0-25	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
DbsB:												
Denham----------	0-9	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	9-49	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	49-80	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-25	0-0	NP
EchAN:												
Edwards, drained	0-9	Muck-------------	PT	A-8	0	0	---	---	---	---	---	---
	9-24	Muck-------------	PT	A-8	0	0	---	---	---	---	---	---
	24-80	Marly material---	---	---	0	0	---	---	---	---	---	---
EchAU:												
Edwards, undrained------	0-24	Muck-------------	PT	A-8	0	0	---	---	---	---	---	---
	24-80	Marly material---	---	---	0	0	---	---	---	---	---	---
EcrAN:												
Edselton, drained--------	0-10	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	10-21	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	21-48	Marly material---	---	---	0	0	---	---	---	---	---	---
	48-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-1, A-3, A-2	0	0	80-100	60-100	30-80	0-35	0-0	NP
EcrAU:												
Edselton, undrained------	0-21	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	21-48	Marly material---	---	---	0	0	---	---	---	---	---	---
	48-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-1, A-2, A-3	0	0	80-100	60-100	30-80	0-35	0-0	NP
GcwA:												
Gilford---------	0-14	Fine sandy loam--	SC-SM, SC, SM	A-4	0	0	95-100	95-100	80-90	35-60	15-25	NP-10
	14-32	Sandy loam, fine sandy loam.	SC, SC-SM, SM	A-2-4	0	0	95-100	95-100	55-90	25-50	10-30	NP-10
	32-38	Loamy sand, sand, loamy fine sand.	SM, SP-SM, SP	A-1-b, A-3, A-2-4	0	0	95-100	95-100	40-95	0-25	0-0	NP
	38-80	Sand, coarse sand, loamy sand.	SP, SM, SP-SM	A-2-4, A-3, A-1-b	0	0	85-100	85-100	35-85	0-25	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
GdvA:												
Gilford---------	0-14	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	80-90	35-60	15-25	NP-10
	14-32	Sandy loam, fine sandy loam.	SC, SC-SM, SM	A-2-4	0	0	85-100	75-98	55-90	25-50	10-30	NP-10
	32-38	Loamy sand, sand, loamy fine sand.	SM, SP-SM, SP	A-1-b, A-3, A-2-4	0	0	85-100	75-100	40-95	0-25	0-0	NP
	38-80	Sand, coarse sand, loamy sand.	SM, SP-SM, SP	A-1-b, A-3, A-2-4	0	0	85-100	75-98	35-85	0-25	0-0	NP
Monon-----------	0-10	Fine sandy loam--	SC-SM, SC, SM	A-4	0	0	95-100	90-98	80-90	35-60	0-25	NP-10
	10-42	Fine sandy loam--	SC, SC-SM, SM	A-2-4	0	0	85-100	75-98	60-90	25-50	10-30	NP-10
	42-80	Bedrock---------	---	---	---	---	---	---	---	---	---	---
GmnA:												
Goodell---------	0-12	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-100	80-90	35-60	15-25	NP-10
	12-32	Sandy loam, fine sandy loam.	SC-SM, SC, SM	A-2-4	0	0	95-100	90-100	55-90	25-50	10-30	NP-10
	32-52	Loamy sand, sand, fine sand.	SM, SP, SP-SM	A-1-b, A-2-4, A-3	0	0	90-100	85-100	40-95	0-25	0-0	NP
	52-80	Loam, fine sandy loam.	CL-ML, ML, SM, CL, SC	A-4, A-6	0-1	0-3	90-100	85-100	65-90	40-70	15-30	NP-15
Gilford---------	0-14	Fine sandy loam--	SC-SM, SC, SM	A-4	0	0	95-100	95-100	80-90	35-60	15-25	NP-10
	14-32	Sandy loam, fine sandy loam.	SC, SC-SM, SM	A-2-4	0	0	95-100	95-100	55-90	25-50	10-30	NP-10
	32-38	Loamy sand, sand, loamy fine sand.	SM, SP-SM, SP	A-1-b, A-2-4, A-3	0	0	95-100	95-100	40-95	0-25	0-0	NP
	38-80	Sand, coarse sand, loamy sand.	SP, SM, SP-SM	A-2-4, A-1-b, A-3	0	0	85-100	85-100	35-85	0-25	0-0	NP
GrfA:												
Granby----------	0-10	Loamy fine sand--	SM	A-2-4	0	0	100	100	90-100	20-35	0-0	NP
	10-32	Sand, fine sand, loamy sand.	SM, SP, SP-SM	A-2, A-3	0	0	100	95-100	50-75	0-20	0-0	NP
	32-80	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	100	95-100	50-70	0-5	0-0	NP
GsaA:												
Granby----------	0-10	Loamy fine sand--	SM	A-2-4	0	0	100	100	90-100	20-35	0-0	NP
	10-32	Sand, fine sand, loamy sand.	SM, SP-SM, SP	A-2, A-3	0	0	100	95-100	50-75	0-20	0-0	NP
	32-80	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	100	95-100	50-70	0-5	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
GsaA:												
Gilford---------	0-14	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	95-100	80-90	35-60	15-25	NP-10
	14-32	Sandy loam, fine sandy loam.	SC, SM, SC-SM	A-2-4	0	0	95-100	95-100	55-90	25-50	10-30	NP-10
	32-38	Loamy sand, sand, loamy fine sand.	SM, SP, SP-SM	A-1-b, A-3, A-2-4	0	0	95-100	95-100	40-95	0-25	0-0	NP
	38-80	Sand, coarse sand, loamy sand.	SM, SP, SP-SM	A-1-b, A-3, A-2-4	0	0	85-100	85-100	35-85	0-25	0-0	NP
HbzA:												
Headlee---------	0-9	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	80-90	35-60	15-25	NP-10
	9-22	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC	A-6, A-4, A-2	0	0	90-100	80-100	45-98	20-90	20-60	5-30
	22-42	Clay loam, silty clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0	98-100	95-100	85-100	70-95	30-65	10-40
	42-50	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-100	5-40	0-0	NP
	50-80	Silt loam, silty clay, silty clay loam.	CH, CL	A-6, A-7-6	0	0	95-100	95-100	90-100	70-100	30-60	10-30
Brady-----------	0-13	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	80-90	35-60	15-25	NP-10
	13-56	Sandy clay loam, sandy loam.	SC, SC-SM	A-2, A-1, A-4, A-6	0	0-5	85-100	80-98	35-90	20-55	20-30	NP-11
	56-80	Gravelly sand, coarse sand, gravel.	GP-GM, GP, SP, SP-SM	A-1, A-2-4, A-3	0-1	0-5	45-100	25-98	10-80	0-15	0-0	NP
HnbA:												
Homer-----------	0-16	Sandy loam-------	SC, SC-SM, SM	A-2-4, A-4	0	0	80-100	75-98	60-80	25-40	15-25	NP-10
	16-22	Sandy clay loam, clay loam, loam.	CL, SC, CL-ML	A-4, A-6, A-7-6	0	0	85-100	75-100	45-95	20-75	20-50	5-30
	22-35	Gravelly sandy clay loam, gravelly loam, gravelly sandy loam.	SC, SC-SM	A-2-6, A-2-4, A-4, A-6	0-1	0-3	60-90	50-75	30-60	15-40	10-50	NP-20
	35-80	Stratified sand to gravelly loamy coarse sand.	SP-SM, SP	A-1	0-1	1-5	65-100	50-98	15-80	0-15	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
HtbAN:												
Houghton, drained--------	0-9	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	9-80	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
HtbAU:												
Houghton, undrained------	0-80	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
MfrAN:												
Madaus, drained	0-9	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	9-48	Marly material---	---	---	0	0	---	---	---	---	0-0	---
	48-80	Loamy sand, fine sand, sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	95-100	80-100	50-90	3-20	0-0	NP
MfrAU:												
Madaus, undrained------	0-9	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	9-48	Marly material---	---	---	0	0	---	---	---	---	0-0	---
	48-80	Loamy sand, fine sand, sand.	SP, SM, SP-SM	A-2-4, A-3	0	0	95-100	80-100	50-90	3-20	0-0	NP
MgyA:												
Maumee----------	0-23	Loamy fine sand--	SM	A-2-4	0	0	100	100	90-100	20-35	0-0	NP
	23-61	Sand, loamy fine sand, fine sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	61-80	Sand, coarse sand, fine sand.	SP, SP-SM	A-2, A-2-4, A-3	0	0	100	95-100	40-70	0-25	0-0	NP
Gilford---------	0-14	Fine sandy loam--	SC, SM, SC-SM	A-4	0	0	95-100	95-100	80-90	35-60	15-25	NP-10
	14-32	Sandy loam, fine sandy loam.	SC, SC-SM, SM	A-2-4	0	0	95-100	95-100	55-90	25-50	10-30	NP-10
	32-38	Loamy sand, sand, loamy fine sand.	SM, SP, SP-SM	A-2-4, A-1-b, A-3	0	0	95-100	95-100	40-95	0-25	0-0	NP
	38-80	Sand, coarse sand, loamy sand.	SM, SP-SM, SP	A-2-4, A-1-b, A-3	0	0	85-100	85-100	35-85	0-25	0-0	NP
MgzA:												
Maumee----------	0-23	Loamy fine sand--	SM	A-2-4	0	0	100	100	90-100	20-35	0-0	NP
	23-61	Sand, loamy fine sand, fine sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	61-80	Sand, coarse sand, fine sand.	SP, SP-SM	A-2, A-2-4, A-3	0	0	100	95-100	40-70	0-25	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
MgzA:												
Gumz------------	0-12	Fine sandy loam--	SM, SC, SC-SM	A-4	0	0	95-100	90-100	80-95	35-60	15-25	NP-10
	12-25	Sand, fine sand, loamy sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	95-100	90-100	55-95	0-25	0-0	NP
	25-50	Sand, fine sand, gravelly sand.	SP, SM, SP-SM	A-2-4, A-1-b, A-3	0	0	75-100	65-100	45-95	0-15	0-0	NP
	50-80	Loam, fine sandy loam.	CL, SC, CL-ML, ML, SM	A-4, A-6	0-1	0-3	90-100	85-100	65-90	40-70	15-30	NP-15
MhaA:												
Maumee----------	0-23	Loamy fine sand--	SM	A-2-4	0	0	100	100	90-100	20-35	0-0	NP
	23-61	Sand, loamy fine sand, fine sand.	SM, SP-SM, SP	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	61-80	Sand, coarse sand, fine sand.	SP, SP-SM	A-3, A-2, A-2-4	0	0	100	95-100	40-70	0-25	0-0	NP
MhbA:												
Maumee----------	0-10	Mucky loamy fine sand.	SM	A-2-4	0	0	100	100	90-100	20-35	0-0	NP
	10-61	Sand, loamy fine sand, fine sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	61-80	Sand, coarse sand, fine sand.	SP, SP-SM	A-2, A-2-4, A-3	0	0	100	95-100	40-70	0-25	0-0	NP
MhnA:												
Medaryville-----	0-11	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	100	90-100	80-90	35-60	15-25	NP-10
	11-32	Fine sandy loam, loamy fine sand, loamy sand.	SC, SM, SC-SM	A-4, A-2-4	0	0	95-100	90-100	60-98	15-50	0-25	NP-10
	32-36	Stratified sand to very fine sand.	SP, SP-SM, SM	A-2-4, A-3	0	0	98-100	95-100	75-100	0-15	0-0	NP
	36-80	Silty clay loam, silty clay.	CL, CH	A-6, A-7-6	0-1	0-3	98-100	95-100	90-100	70-100	30-55	11-32
MlwB:												
Metea-----------	0-9	Loamy sand-------	SM, SP-SM	A-2-4	0	0	100	95-98	75-90	10-25	0-0	NP
	9-28	Loamy fine sand, sand, loamy sand.	SM, SP-SM	A-2-4	0	0	100	85-98	75-90	0-25	0-0	NP
	28-32	Sandy clay loam, fine sandy loam, sandy loam.	CL-ML, SC, CL, SC-SM	A-2-4, A-4	0	0	90-100	75-100	55-95	25-60	10-60	NP-20
	32-44	Loam, clay loam--	CL, CL-ML	A-4, A-6	0	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	44-80	Loam, fine sandy loam.	SC, CL, CL-ML, ML	A-6, A-4	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
MlwB:												
Moon	0-9	Loamy sand	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	10-25	0-0	NP
	9-23	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	0-25	0-0	NP
	23-35	Sandy clay loam, sandy loam.	CL, SC, SC-SM	A-6, A-4, A-2-4	0	0	90-100	75-100	55-95	25-60	10-60	NP-20
	35-45	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	45-80	Loam, fine sandy loam.	SM, SC, CL, CL-ML, ML	A-6, A-4	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
MmyC2:												
Miami	0-8	Fine sandy loam	SC, SC-SM, SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-15
	8-36	Clay loam, loam	CL, CL-ML	A-6, A-7	0	0	90-100	90-100	85-95	55-80	20-50	5-30
	36-80	Loam, fine sandy loam.	CL-ML, SC, CL, SC-SM	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
MnzB:												
Miami	0-8	Fine sandy loam	SC, SC-SM, SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-15
	8-36	Clay loam, loam	CL, CL-ML	A-7, A-6	0	0	90-100	90-100	85-95	55-80	20-50	5-30
	36-80	Loam, fine sandy loam.	CL-ML, SC, CL, SC-SM	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
Williamstown	0-7	Fine sandy loam	SC-SM, SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	7-34	Clay loam, loam	CL, CL-ML	A-6, A-7	0	0	90-100	90-100	85-95	55-80	20-50	5-30
	34-56	Loam, fine sandy loam.	CL, SM, ML, SC	A-4, A-6	0	0	90-100	85-98	65-95	40-70	15-40	NP-25
	56-80	Loam, fine sandy loam.	CL, CL-ML, ML, SM, SC	A-4, A-6	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
MouA:												
Milford	0-18	Silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	70-90	25-40	5-20
	18-50	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	0	100	95-100	90-100	75-100	40-60	20-40
	50-60	Stratified silt loam to silty clay loam to silty clay.	CL, SC	A-6, A-7	0	0	95-100	95-100	90-100	45-100	25-50	10-30

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MtoA:												
Moon------------	0-9	Loamy sand-------	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	10-25	0-0	NP
	9-23	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	0-25	0-0	NP
	23-35	Sandy clay loam, sandy loam.	SC, CL, SC-SM	A-6, A-2-4, A-4	0	0	90-100	75-100	55-95	25-60	10-60	NP-20
	35-45	Loam, clay loam--	CL, CL-ML	A-4, A-6	0	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	45-80	Loam, fine sandy loam.	CL, CL-ML, SM, ML, SC	A-6, A-4	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
Ormas-----------	0-10	Loamy sand-------	SM, SP-SM	A-2-4	0	0	95-100	95-100	60-85	10-25	0-0	NP
	10-32	Sand, fine sand, loamy sand.	SP-SM, SM, SW-SM	A-2-4, A-3	0	0	90-100	85-100	55-85	0-25	0-0	NP
	32-50	Gravelly sandy loam, gravelly loamy sand, gravelly sandy clay loam.	SC-SM, SM	A-2-4	0	0	65-100	55-80	30-70	10-35	10-40	NP-20
	50-80	Gravelly sand, very gravelly coarse sand, gravelly coarse sand.	GP, GP-GM, SP-SM, SP	A-1-b	0	0-3	45-85	25-75	10-40	0-10	0-0	NP
MtoB:												
Moon------------	0-9	Loamy sand-------	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	10-25	0-0	NP
	9-23	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	0-25	0-0	NP
	23-35	Sandy clay loam, sandy loam.	SC-SM, SC, CL	A-2-4, A-6, A-4	0	0	90-100	75-100	55-95	25-60	10-60	NP-20
	35-45	Loam, clay loam--	CL, CL-ML	A-4, A-6	0	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	45-80	Loam, fine sandy loam.	CL-ML, ML, CL, SC, SM	A-6, A-4	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
Ormas-----------	0-10	Loamy sand-------	SM, SP-SM	A-2-4	0	0	95-100	95-100	60-85	10-25	0-0	NP
	10-32	Sand, fine sand, loamy sand.	SM, SW-SM, SP-SM	A-2-4, A-3	0	0	90-100	85-100	55-85	0-25	0-0	NP
	32-50	Gravelly sandy loam, gravelly loamy sand, gravelly sandy clay loam.	SC-SM, SM	A-2-4	0	0	65-100	55-80	30-70	10-35	10-40	NP-20
	50-80	Gravelly sand, very gravelly coarse sand, gravelly coarse sand.	GP-GM, GP, SP, SP-SM	A-1-b	0	0-3	45-85	25-75	10-40	0-10	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
MtpA:												
Moon------------	0-9	Loamy sand-------	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	10-25	0-0	NP
	9-23	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2-4	0	0	85-100	75-100	55-90	0-25	0-0	NP
	23-35	Sandy clay loam, sandy loam.	SC, CL, SC-SM	A-2-4, A-6, A-4	0	0	90-100	75-100	55-95	25-60	10-60	NP-20
	35-45	Loam, clay loam--	CL, CL-ML	A-4, A-6	0	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	45-80	Loam, fine sandy loam.	CL, CL-ML, SM, ML, SC	A-6, A-4	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
Selfridge-------	0-8	Loamy fine sand--	SM, SP-SM	A-2-4	0	0	95-100	90-100	85-95	10-25	0-0	NP
	8-25	Sand, loamy sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0-1	95-100	90-100	55-95	5-25	0-0	NP
	25-29	Loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, ML, SC	A-6, A-2-4, A-4, A-2-6	0	0-1	90-100	85-100	50-95	25-60	17-40	NP-25
	29-32	Silty clay loam, loam, clay loam.	CL-ML, CL	A-6, A-7-6, A-4	0	0-1	90-100	85-100	80-100	55-95	20-50	5-30
	32-80	Loam-------------	CL-ML, ML, CL, SC	A-4, A-6	0-1	0-3	90-100	85-98	70-90	45-70	15-30	NP-15
MupA:												
Morocco---------	0-9	Loamy fine sand--	SM, SP-SM	A-2-4	0	0	100	98-100	75-95	0-25	0-0	NP
	9-60	Fine sand, sand, loamy fine sand, loamy sand.	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	60-80	Fine sand, sand--	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
MvhAN:												
Moston, drained	0-8	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	8-24	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	24-48	Coprogenous material.	OL	A-5	0	0	95-100	95-100	85-100	75-96	40-50	2-8
	48-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-2, A-1, A-3	0	0	80-100	60-100	30-80	0-35	0-0	NP
MvhAU:												
Moston, undrained------	0-24	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	24-48	Coprogenous material.	OL	A-5	0	0	95-100	95-100	85-100	75-96	40-50	2-8
	48-80	Sand, fine sand, gravelly loamy sand.	SM, SP	A-2, A-1, A-3	0	0	80-100	60-100	30-80	0-35	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
MwzAN:												
Muskego, drained	0-9	Muck	PT	A-8	---	---	---	---	---	---	---	---
	9-27	Muck	PT	A-8	---	---	---	---	---	---	---	---
	27-80	Coprogenous material.	OL	A-5	0	0	95-100	95-100	85-100	75-96	40-50	2-8
MwzAU:												
Muskego, undrained	0-27	Muck	PT	A-8	---	---	---	---	---	---	---	---
	27-80	Coprogenous material.	OL	A-5	0	0	95-100	95-100	85-100	75-96	40-50	2-8
NofA:												
Newton	0-10	Loamy fine sand	SM	A-2-4	0	0	100	98-100	85-95	15-25	0-0	NP
	10-15	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	15-80	Fine sand, sand	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
Morocco	0-9	Loamy fine sand	SM, SP-SM	A-2-4	0	0	100	98-100	75-95	0-25	0-0	NP
	9-60	Fine sand, sand, loamy fine sand, loamy sand.	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	60-80	Fine sand, sand	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
OacA:												
Oakville	0-3	Fine sand	SP, SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	3-59	Fine sand	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	59-80	Sand, fine sand	SM, SP-SM, SP	A-2-4, A-3	0	0	100	100	70-95	0-15	0-0	NP
Denham	0-9	Fine sand	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	9-49	Fine sand	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	49-80	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-100	0-25	0-0	NP
OacB:												
Oakville	0-3	Fine sand	SP, SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	3-59	Fine sand	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	59-80	Sand, fine sand	SM, SP-SM, SP	A-2-4, A-3	0	0	100	100	70-95	0-15	0-0	NP
Denham	0-9	Fine sand	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	9-49	Fine sand	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	49-80	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0	100	100	85-100	0-25	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
OaeC:												
Oakville--------	0-3	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	3-59	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	59-80	Sand, fine sand--	SM, SP-SM, SP	A-2-4, A-3	0	0	100	100	70-95	0-15	0-0	NP
OaeD:												
Oakville--------	0-3	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	3-59	Fine sand--------	SM, SP, SP-SM	A-2-4, A-3	0	0	100	100	85-95	0-15	0-0	NP
	59-80	Sand, fine sand--	SM, SP-SM, SP	A-2-4, A-3	0	0	100	100	70-95	0-15	0-0	NP
OeaA:												
Odell-----------	0-11	Fine sandy loam--	SC-SM, SM	A-4	0	0	95-100	90-100	85-95	45-55	15-30	NP-10
	11-31	Clay loam, loam--	CL, CL-ML	A-4, A-7, A-6	0	0	90-100	80-100	75-95	55-85	20-55	5-35
	31-80	Fine sandy loam, loam.	CL-ML, CL, ML, SC, SM	A-4, A-6	0-1	0-3	90-100	80-98	70-90	40-70	15-30	NP-15
OecA:												
Odell-----------	0-11	Fine sandy loam--	SC-SM, SM	A-4	0	0	95-100	90-100	85-95	45-55	15-30	NP-10
	11-31	Clay loam, loam--	CL, CL-ML	A-4, A-6, A-7	0	0	90-100	80-100	75-95	55-85	20-55	5-35
	31-80	Fine sandy loam, loam.	CL-ML, CL, ML, SC, SM	A-4, A-6	0-1	0-3	90-100	80-98	70-90	40-70	15-30	NP-15
Francesville----	0-12	Fine sandy loam--	SC-SM, SM	A-4	0	0	95-100	90-100	85-95	40-55	15-30	NP-10
	12-20	Clay loam, sandy clay loam.	CL, CL-ML	A-6, A-4, A-7	0	0	90-100	80-100	75-95	55-85	20-55	5-35
	20-27	Fine sandy loam, loam.	SC, SM, CL, ML	A-4, A-6	0-1	0-3	90-100	80-100	70-95	40-70	15-30	NP-15
	27-56	Fine sandy loam, loam.	CL, ML, CL-ML, SC, SM	A-6, A-4	0-1	0-3	90-100	80-98	70-90	40-70	15-30	NP-15
	56-80	Bedrock----------	---	---	---	---	---	---	---	---	---	---
Pmg:												
Pits, gravel----	0-80	Very gravelly coarse sand.	SM, GP-GM, SP, SP-SM	A-1, A-3, A-2	0-2	0-5	45-100	40-100	0-80	0-40	0-14	NP
Pps:												
Pits, quarries, limestone.												

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
RebA:												
Radioville------	0-18	Loam------------	CL-ML, CL, ML	A-4, A-6	0	0	95-100	90-100	75-100	50-65	20-40	3-20
	18-42	Clay loam, loam--	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	60-100	50-75	20-50	5-30
	42-53	Stratified fine sand to silt loam.	CL-ML, SM, SP-SM, CL, ML, SP	A-3, A-6, A-2-4, A-2-6, A-4	0	0	95-100	90-100	55-98	0-85	0-40	NP-15
	53-80	Silty clay, silty clay loam.	CL, CH	A-6, A-7-6	0	0	98-100	95-100	90-100	70-100	30-55	11-32
Mermill---------	0-9	Loam------------	CL, CL-ML, ML	A-4	0	0	98-100	95-100	85-100	55-75	20-40	3-20
	9-28	Clay loam, sandy clay loam, loam.	CL, SC-SM, CL-ML, SC	A-4, A-6	0	0	95-100	90-100	80-95	40-85	20-40	5-30
	28-57	Silty clay, silty clay loam.	CH, CL	A-6, A-7-6	0-1	0-2	98-100	90-100	85-95	70-85	30-65	10-40
	57-80	Silty clay, silty clay loam.	CH, CL	A-6, A-7-6	0-1	0-2	98-100	90-100	85-95	70-85	30-65	10-40
RevA:												
Rensselaer------	0-15	Loam------------	CL, ML, CL-ML	A-4, A-6	0	0	95-100	90-98	75-85	50-65	20-40	3-20
	15-38	Clay loam, loam--	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	60-95	50-75	20-50	5-30
	38-42	Sandy clay loam, loam, sandy loam.	CL-ML, SC, CL, SC-SM, ML, SM	A-2-6, A-2-4, A-4, A-6	0	0	85-100	75-100	60-95	25-60	20-40	NP-20
	42-76	Stratified fine sand to silt loam.	CL-ML, SM, SP-SM, CL, ML, SP	A-2-4, A-6, A-4, A-3, A-2-6	0	0	95-100	90-100	55-95	0-85	0-40	NP-15
	76-80	Loam, fine sandy loam.	CL, SC, CL-ML, SM, ML	A-6, A-4	0-1	0-3	90-100	85-100	65-90	40-70	15-30	NP-15
Radioville------	0-18	Loam------------	CL, ML, CL-ML	A-4, A-6	0	0	95-100	90-100	75-100	50-65	20-40	3-20
	18-42	Clay loam, loam--	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	60-100	50-75	20-50	5-30
	42-53	Stratified fine sand to silt loam.	CL, CL-ML, SP, SM, SP-SM, ML	A-3, A-6, A-2-6, A-2-4, A-4	0	0	95-100	90-100	55-98	0-85	0-40	NP-15
	53-80	Silty clay, silty clay loam.	CL, CH	A-6, A-7-6	0	0	98-100	95-100	90-100	70-100	30-55	11-32

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
ReyA:												
Rensselaer------	0-15	Loam------------	CL-ML, CL, ML	A-4, A-6	0	0	95-100	90-98	75-85	50-65	20-40	3-20
	15-38	Clay loam, loam--	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	60-95	50-75	20-50	5-30
	38-42	Sandy clay loam, loam, sandy loam.	CL-ML, SC, SC-SM, CL, SM, ML	A-2-4, A-6, A-2-6, A-4	0	0	85-100	75-100	60-95	25-60	20-40	NP-20
	42-76	Stratified fine sand to silt loam.	CL-ML, SM, CL, SP-SM, SP, ML	A-6, A-2-4, A-3, A-4, A-2-6	0	0	95-100	90-100	55-95	0-85	0-40	NP-15
	76-80	Loam, fine sandy loam.	SC, CL, SM, CL-ML, ML	A-6, A-4	0-1	0-3	90-100	85-100	65-90	40-70	15-30	NP-15
RhcA:												
Riddles---------	0-8	Fine sandy loam--	SC-SM, SM	A-4	0	0	95-100	80-100	75-90	40-55	15-30	NP-10
	8-13	Sandy clay loam, loam, fine sandy loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0	0	90-100	80-100	75-95	40-70	10-50	NP-30
	13-33	Clay loam, loam, sandy clay loam.	CL-ML, SC, CL, SC-SM	A-4, A-6	0	0-1	90-100	80-100	75-95	40-80	20-50	5-30
	33-63	Sandy loam, loam, fine sandy loam.	ML, SC-SM, CL-ML, SM	A-4	0-1	0-3	90-100	80-98	65-90	40-70	15-30	NP-15
	63-90	Sandy loam, loamy sand.	SC-SM, SC, SM, SP-SM	A-2-4, A-4	0	0	80-100	78-98	55-85	10-40	17-27	NP-10
	90-100	Loam, fine sandy loam.	CL, CL-ML, SC-SM, SC	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
ScuA:												
Sebewa----------	0-14	Loam------------	CL, CL-ML	A-4, A-6	0	0	95-100	75-100	65-95	50-75	20-35	4-15
	14-36	Sandy clay loam, clay loam, gravelly clay loam.	CL, SC	A-2, A-6, A-7	0	0	95-100	60-90	50-90	25-75	25-45	10-25
	36-80	Gravelly sand, very gravelly coarse sand, sand.	GP-GM, SP, GP, SP-SM	A-2, A-1, A-3	0	0-5	40-95	25-90	20-60	0-10	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
SdzcB:												
Selfridge-------	0-8	Loamy fine sand--	SM, SP-SM	A-2-4	0	0	95-100	90-100	85-95	10-25	0-0	NP
	8-25	Sand, loamy sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0-1	95-100	90-100	55-95	5-25	0-0	NP
	25-29	Loam, sandy clay loam, sandy loam.	CL-ML, ML, CL, SC, SC-SM	A-6, A-2-4, A-4, A-2-6	0	0-1	90-100	85-100	50-95	25-60	17-40	NP-25
	29-32	Silty clay loam, loam, clay loam.	CL-ML, CL	A-6, A-7-6, A-4	0	0-1	90-100	85-100	80-100	55-95	20-50	5-30
	32-80	Loam-------------	CL, CL-ML, SC, ML	A-4, A-6	0-1	0-3	90-100	85-98	70-90	45-70	15-30	NP-15
Brems-----------	0-9	Loamy fine sand--	SM	A-2-4, A-3	0	0	100	100	90-100	5-35	0-0	NP
	9-72	Sand, fine sand, loamy sand.	SM, SP, SP-SM	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP
	72-80	Sand, fine sand, loamy sand.	SP, SM, SP-SM	A-2-4, A-3	0	0	100	85-100	55-95	0-25	0-0	NP
SgzA:												
Selfridge-------	0-8	Loamy fine sand--	SM, SP-SM	A-2-4	0	0	95-100	90-100	85-95	10-25	0-0	NP
	8-25	Sand, loamy sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0-1	95-100	90-100	55-95	5-25	0-0	NP
	25-29	Loam, sandy clay loam, sandy loam.	CL-ML, ML, CL, SC, SC-SM	A-6, A-2-4, A-4, A-2-6	0	0-1	90-100	85-100	50-95	25-60	17-40	NP-25
	29-32	Silty clay loam, loam, clay loam.	CL-ML, CL	A-6, A-7-6, A-4	0	0-1	90-100	85-100	80-100	55-95	20-50	5-30
	32-80	Loam-------------	CL, CL-ML, SC, ML	A-4, A-6	0-1	0-3	90-100	85-98	70-90	45-70	15-30	NP-15
ShaA:												
Selfridge-------	0-8	Loamy fine sand--	SM, SP-SM	A-2-4	0	0	95-100	90-100	85-95	10-25	0-0	NP
	8-25	Sand, loamy sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	0-1	95-100	90-100	55-95	5-25	0-0	NP
	25-29	Loam, sandy clay loam, sandy loam.	CL-ML, ML, SC, CL, SC-SM	A-6, A-2-4, A-4, A-2-6	0	0-1	90-100	85-100	50-95	25-60	17-40	NP-25
	29-32	Silty clay loam, loam, clay loam.	CL-ML, CL	A-6, A-7-6, A-4	0	0-1	90-100	85-100	80-100	55-95	20-50	5-30
	32-80	Loam-------------	CL, CL-ML, SC, ML	A-4, A-6	0-1	0-3	90-100	85-98	70-90	45-70	15-30	NP-15

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
ShaA:												
Morocco---------	0-9	Loamy fine sand--	SM, SP-SM	A-2-4	0	0	100	98-100	75-95	0-25	0-0	NP
	9-60	Fine sand, sand, loamy fine sand, loamy sand.	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
	60-80	Fine sand, sand--	SM, SP-SM	A-2-4, A-3	0	0	100	98-100	70-95	0-25	0-0	NP
SmsAK:												
Sloan-----------	0-15	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	85-100	70-95	20-40	3-15
	15-45	Silty clay loam, clay loam, silt loam.	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	75-95	30-45	8-18
	45-80	Stratified gravelly sandy loam to silty clay loam.	CL-ML, CL, ML	A-4, A-6	0	0	95-100	70-100	60-95	50-90	20-40	3-15
SnlA:												
Southwest-------	0-10	Silt loam--------	CL, ML	A-4, A-6	0	0	100	100	95-100	75-100	27-39	3-15
	10-23	Silty clay loam, silt loam.	CL, ML	A-4, A-6	0	0	100	100	95-100	75-100	27-39	3-15
	23-34	Silt loam, silty clay loam, loam.	CL-ML, CL, ML	A-4, A-6	0	0	95-100	92-100	85-100	50-100	20-45	3-33
	34-45	Silt loam, silty clay loam, loam.	CL, CL-ML, ML	A-4, A-7-6, A-6	0	0	95-100	92-100	85-100	50-100	20-45	3-33
	45-75	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7-6	0	0	95-100	92-100	85-100	65-100	25-45	3-28
	75-80	Loam, silt loam, clay loam.	CL, ML, CL-ML	A-6, A-4, A-7-6	0	0-1	95-100	92-100	75-100	50-100	20-45	NP-24
SwiA:												
Strole----------	0-12	Silt loam--------	CL, ML	A-4, A-6	0	0	100	100	95-100	80-100	30-40	3-20
	12-29	Silty clay-------	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	18-30
	29-60	Silty clay-------	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	15-30
	60-80	Silty clay loam, silty clay.	CH, CL	A-7-6	0	0	100	100	85-100	75-100	30-55	11-30
SwxA:												
Sumava----------	0-12	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	85-90	35-60	15-25	NP-10
	12-36	Fine sandy loam--	SC, SC-SM, SM	A-2-4, A-4	0	0	95-100	90-98	80-95	25-50	15-25	NP-10
	36-63	Loam, fine sandy loam.	CL-ML, ML, CL, SC	A-4	0-1	0-3	90-100	85-98	65-90	40-70	15-25	NP-10
	63-79	Loamy sand, gravelly loamy sand.	SM, SP-SM	A-1, A-2	0	0-5	80-95	60-90	30-70	10-25	15-20	NP-4
	79-82	Loam, fine sandy loam.	CL, CL-ML, ML, SM, SC	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-25	NP-15

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
TmaAN:												
Toto, drained---	0-9	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	9-24	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	24-30	Coprogenous material.	OL	A-5	0	0	100	100	---	---	40-50	2-8
	30-38	Marly material---	OL	A-4	0	0	100	100	---	---	0-0	NP
	38-80	Sand-------------	SM, SP-SM	A-2-4, A-3	0	0	98-100	95-100	60-90	0-15	0-0	NP
TmaAU:												
Toto, undrained	0-24	Muck-------------	PT	A-8	---	---	---	---	---	---	---	---
	24-30	Coprogenous material.	OL	A-5	0	0	100	100	---	---	40-50	2-8
	30-38	Marly material---	OL	A-4	0	0	100	100	---	---	0-0	---
	38-80	Sand-------------	SM, SP-SM	A-2-4, A-3	0	0	98-100	95-100	60-90	0-15	0-0	NP
UbrA:												
Udorthents, clayey---------	0-80	Silty clay loam--	CL	A-6, A-7	0-1	0-3	98-100	95-100	85-95	70-85	25-45	10-25
W:												
Water.												
WmgA:												
Whiskerville----	0-9	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-100	85-98	35-60	15-25	NP-10
	9-42	Fine sandy loam, sandy loam, sandy clay loam.	SC-SM, SM, SC, CL	A-6, A-4, A-2	0	0	95-100	90-100	65-90	20-80	15-30	NP-11
	42-80	Silty clay, silty clay loam.	CL, CH	A-6, A-7-6	0-1	0-3	98-100	95-100	90-100	70-100	30-55	11-32
Bronson---------	0-9	Fine sandy loam--	SC-SM, SC, SM	A-4	0	0	95-100	90-100	85-90	35-60	15-30	NP-10
	9-20	Sandy loam-------	SC-SM, SM	A-4, A-2	0	0-5	95-100	90-100	55-70	25-40	15-25	NP-7
	20-43	Sandy loam, sandy clay loam, gravelly sandy loam.	SC, SC-SM	A-6, A-4, A-1, A-2	0	0-5	80-95	60-90	35-85	20-50	20-30	4-11
	43-56	Loamy sand, gravelly loamy sand.	SM, SP-SM	A-1, A-2	0	0-5	80-95	60-90	30-70	10-25	15-20	NP-4
	56-80	Sand, gravelly sand, coarse sand.	SP, SP-SM	A-2, A-1, A-3	0	0-10	80-95	65-90	30-75	0-10	0-0	NP

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
WmiA:												
Whitepost-------	0-12	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	80-90	35-60	15-25	NP-10
	12-25	Fine sandy loam, sandy loam.	SC, SC-SM, SM	A-2-4	0	0	85-100	75-98	60-90	25-50	10-30	NP-10
	25-40	Loamy fine sand, loamy sand, fine sandy loam, sandy loam.	SM, SP, SP-SM	A-3, A-2-4, A-1-b	0	0	85-100	75-100	40-95	0-25	0-0	NP
	40-54	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	100	95-100	50-70	0-5	0-0	NP
	54-80	Silty clay, silty clay loam.	CL	A-6, A-7	0-1	0-3	98-100	95-100	85-95	70-85	25-45	10-25
Gilford---------	0-14	Fine sandy loam--	SC, SC-SM, SM	A-4	0	0	95-100	90-98	80-90	35-60	15-25	NP-10
	14-32	Sandy loam, fine sandy loam.	SC, SM, SC-SM	A-2-4	0	0	85-100	75-98	55-90	25-50	10-30	NP-10
	32-38	Loamy sand, sand, loamy fine sand.	SM, SP, SP-SM	A-1-b, A-2-4, A-3	0	0	85-100	75-100	40-95	0-25	0-0	NP
	38-80	Sand, coarse sand, loamy sand.	SP, SM, SP-SM	A-2-4, A-1-b, A-3	0	0	85-100	75-98	35-85	0-25	0-0	NP
WoeB:												
Williamstown----	0-7	Fine sandy loam--	SC-SM, SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	7-34	Clay loam, loam--	CL, CL-ML	A-6, A-7	0	0	90-100	90-100	85-95	55-80	20-50	5-30
	34-56	Loam, fine sandy loam.	SC, SM, CL, ML	A-6, A-4	0	0	90-100	85-98	65-95	40-70	15-40	NP-25
	56-80	Loam, fine sandy loam.	SC, CL, SM, ML, CL-ML	A-6, A-4	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
Crosier---------	0-11	Fine sandy loam--	CL, SM, CL-ML, SC-SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	11-30	Clay loam, loam, sandy clay loam.	CL, CL-ML, SC	A-6, A-7	0	0-1	90-100	90-100	75-95	45-80	20-50	5-30
	30-80	Loam, sandy loam	SM, CL, SC, CL-ML, ML	A-4, A-6	0-1	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
WogA:												
Williamstown----	0-7	Fine sandy loam--	SC-SM, SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	7-34	Clay loam, loam--	CL, CL-ML	A-6, A-7	0	0	90-100	90-100	85-95	55-80	20-50	5-30
	34-56	Loam, fine sandy loam.	CL, ML, SM, SC	A-6, A-4	0	0	90-100	85-98	65-95	40-70	15-40	NP-25
	56-80	Loam, fine sandy loam.	SM, SC, CL-ML, CL, ML	A-6, A-4	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
WoxA:												
Williamstown----	0-7	Fine sandy loam--	SC-SM, SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	7-34	Clay loam, loam--	CL, CL-ML	A-6, A-7	0	0	90-100	90-100	85-95	55-80	20-50	5-30
	34-56	Loam, fine sandy loam.	ML, CL, SC, SM	A-6, A-4	0	0	90-100	85-98	65-95	40-70	15-40	NP-25
	56-80	Loam, fine sandy loam.	SM, SC, CL-ML, CL, ML	A-6, A-4	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
Winamac---------	0-12	Fine sandy loam--	SM, SC-SM, SC	A-4	0	0	95-100	90-100	85-90	35-60	15-25	NP-10
	12-44	Very fine sandy loam, sandy loam, sandy clay loam.	SC, SC-SM, SM, CL	A-4, A-6, A-2-6, A-2-4	0	0	95-100	90-100	80-100	25-70	15-40	NP-18
	44-58	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	95-100	90-100	55-98	0-15	0-0	NP
	58-80	Loam, fine sandy loam.	CL, CL-ML, ML, SM, SC	A-4, A-6	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
WoxB:												
Williamstown----	0-7	Fine sandy loam--	SM, SC-SM	A-4	0	0	95-100	90-100	85-90	45-55	15-30	NP-10
	7-34	Clay loam, loam--	CL, CL-ML	A-6, A-7	0	0	90-100	90-100	85-95	55-80	20-50	5-30
	34-56	Loam, fine sandy loam.	ML, CL, SC, SM	A-4, A-6	0	0	90-100	85-98	65-95	40-70	15-40	NP-25
	56-80	Loam, fine sandy loam.	SC, SM, CL, CL-ML, ML	A-6, A-4	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
Winamac---------	0-12	Fine sandy loam--	SC-SM, SM, SC	A-4	0	0	95-100	90-100	85-90	35-60	15-25	NP-10
	12-44	Very fine sandy loam, sandy loam, sandy clay loam.	SC, SC-SM, SM, CL	A-4, A-6, A-2-6, A-2-4	0	0	95-100	90-100	80-100	25-70	15-40	NP-18
	44-58	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	95-100	90-100	55-98	0-15	0-0	NP
	58-80	Loam, fine sandy loam.	CL, CL-ML, ML, SM, SC	A-4, A-6	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
WpaA:												
Winamac---------	0-12	Fine sandy loam--	SM, SC-SM, SC	A-4	0	0	95-100	90-100	85-90	35-60	15-25	NP-10
	12-44	Very fine sandy loam, sandy loam, sandy clay loam.	SC, SC-SM, SM, CL	A-4, A-2-6, A-6, A-2-4	0	0	95-100	90-100	80-100	25-70	15-40	NP-18
	44-58	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	95-100	90-100	55-98	0-15	0-0	NP
	58-80	Loam, fine sandy loam.	CL, ML, SC, CL-ML, SM	A-4, A-6	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20

Table 19.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
WpaA:												
Bronson---------	0-9	Fine sandy loam--	SC-SM, SC, SM	A-4	0	0	95-100	90-100	85-90	35-60	15-30	NP-10
	9-20	Sandy loam-------	SC-SM, SM	A-2, A-4	0	0-5	95-100	90-100	55-70	25-40	15-25	NP-7
	20-43	Sandy loam, sandy clay loam, gravelly sandy loam.	SC, SC-SM	A-6, A-4, A-1, A-2	0	0-5	80-95	60-90	35-85	20-50	20-30	4-11
	43-56	Loamy sand, gravelly loamy sand.	SM, SP-SM	A-1, A-2	0	0-5	80-95	60-90	30-70	10-25	15-20	NP-4
	56-80	Sand, gravelly sand, coarse sand.	SP, SP-SM	A-2, A-1, A-3	0	0-10	80-95	65-90	30-75	0-10	0-0	NP
WpbA:												
Winamac---------	0-12	Fine sandy loam--	SC-SM, SC, SM	A-4	0	0	95-100	90-100	85-90	35-60	15-25	NP-10
	12-44	Very fine sandy loam, sandy loam, sandy clay loam.	SC, SC-SM, SM, CL	A-4, A-6, A-2-6, A-2-4	0	0	95-100	90-100	80-100	25-70	15-40	NP-18
	44-58	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	95-100	90-100	55-98	0-15	0-0	NP
	58-80	Loam, fine sandy loam.	CL-ML, CL, ML, SC, SM	A-4, A-6	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
WpbB:												
Winamac---------	0-12	Fine sandy loam--	SC-SM, SM, SC	A-4	0	0	95-100	90-100	85-90	35-60	15-25	NP-10
	12-44	Very fine sandy loam, sandy loam, sandy clay loam.	SC, SC-SM, SM, CL	A-6, A-2-4, A-4, A-2-6	0	0	95-100	90-100	80-100	25-70	15-40	NP-18
	44-58	Sand, fine sand--	SP, SP-SM	A-2, A-3	0	0	95-100	90-100	55-98	0-15	0-0	NP
	58-80	Loam, fine sandy loam.	CL, CL-ML, ML, SM, SC	A-4, A-6	0	0-2	90-100	85-98	65-90	40-70	15-35	NP-20
WrxAN:												
Wunabuna--------	0-21	Silt loam--------	CL, ML	A-4, A-6	0	0	100	100	95-100	75-100	26-39	2-15
	21-32	Silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-7-6, A-6	0	0	100	100	95-100	75-100	26-46	4-24
	32-38	Silty clay loam, silt loam.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	0	100	100	95-100	75-100	26-46	4-24
	38-80	Muck-------------	PT	A-8	---	---	---	---	---	---	0-0	NP

Table 20.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
AadAK:														
Abscota	0-5	50-80	10-45	5-15	1.40-1.70	0.60-2.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	5	3	86
	5-14	70-98	0-25	0-10	1.35-1.60	6.00-20.00	0.05-0.11	0.0-2.9	0.5-1.0	.17	.17			
	14-60	85-100	0-10	0-10	1.45-1.60	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.0	.15	.15			
AatAN:														
Ackerman, drained	0-8	---	---	0-5	0.30-0.60	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	8-14	---	---	0-0	0.30-0.60	0.06-0.20	0.18-0.24	3.0-5.9	5.0-20	---	---			
	14-80	75-98	0-25	0-10	1.60-1.80	6.00-20.00	0.06-0.08	0.0-2.9	0.0-1.0	.15	.15			
AatAU:														
Ackerman, undrained	0-8	---	---	0-5	0.30-0.60	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	8-14	---	---	0-0	0.30-0.60	0.06-0.20	0.18-0.24	3.0-5.9	5.0-20	---	---			
	14-80	75-98	0-25	0-10	1.60-1.80	6.00-20.00	0.06-0.08	0.0-2.9	0.0-1.0	.15	.15			
AbhAN:														
Adrian, drained	0-9	---	---	0-0	0.30-0.55	0.20-6.00	0.35-0.45	---	55-75	---	---	2	2	134
	9-34	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---			
	34-80	75-98	0-25	0-10	1.40-1.75	6.00-20.00	0.03-0.08	0.0-2.9	0.0-1.0	.15	.15			
AbhAU:														
Adrian, undrained	0-34	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---	2	2	134
	34-80	75-98	0-25	0-10	1.40-1.75	6.00-20.00	0.03-0.08	0.0-2.9	0.0-1.0	.15	.15			
ApuAN:														
Antung, drained	0-9	---	---	0-0	0.30-0.55	0.20-6.00	0.35-0.45	---	55-75	---	---	2	2	134
	9-12	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---			
	12-80	75-98	0-10	0-10	1.40-1.75	6.00-20.00	0.03-0.08	0.0-2.9	0.0-1.0	.15	.15			
ApuAU:														
Antung, undrained	0-12	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---	2	2	134
	12-80	75-98	0-10	0-10	1.40-1.75	6.00-20.00	0.03-0.08	0.0-2.9	0.0-1.0	.15	.15			
BrvA:														
Brady	0-13	50-80	10-45	5-15	1.30-1.60	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	13-56	45-80	10-45	10-25	1.60-1.80	2.00-6.00	0.10-0.18	0.0-2.9	0.5-1.0	.15	.15			
	56-80	85-98	0-10	0-5	1.60-1.80	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.05			
BstA:														
Brems	0-9	70-90	1-15	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.05	.05	5	2	134
	9-72	75-98	0-15	1-10	1.60-1.75	6.00-20.00	0.05-0.08	0.0-2.9	0.0-0.5	.02	.02			
	72-80	75-98	0-15	1-6	1.60-1.75	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
BstB:														
Brems-------------------	0-9	70-90	1-15	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.05	.05	5	2	134
	9-72	75-98	0-15	1-10	1.60-1.75	6.00-20.00	0.05-0.08	0.0-2.9	0.0-0.5	.02	.02			
	72-80	75-98	0-15	1-6	1.60-1.75	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
BswA:														
Brems-------------------	0-9	70-90	1-15	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.05	.05	5	2	134
	9-72	75-98	0-15	1-10	1.60-1.75	6.00-20.00	0.05-0.08	0.0-2.9	0.0-0.5	.02	.02			
	72-80	75-98	0-15	1-6	1.60-1.75	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
Morocco-----------------	0-9	70-90	1-15	1-10	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.05	.05	5	2	134
	9-60	70-100	0-15	1-10	1.50-1.70	6.00-20.00	0.05-0.11	0.0-2.9	0.0-0.5	.02	.02			
	60-80	85-100	0-10	1-6	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
BupB:														
Bronson-----------------	0-9	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.15	.15	4	3	86
	9-20	50-80	10-45	2-15	1.35-1.60	1.98-5.95	0.12-0.14	0.0-2.9	0.0-0.5	.24	.24			
	20-43	45-80	10-45	10-25	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-0.5	.24	.24			
	43-56	70-95	2-25	2-10	1.35-1.60	5.95-19.98	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
	56-80	85-98	0-10	0-5	1.50-1.65	5.95-19.98	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10			
BuuA:														
Brookston---------------	0-9	30-50	30-50	14-27	1.35-1.50	0.60-2.00	0.20-0.22	0.0-2.9	3.0-5.0	.24	.24	5	5	56
	9-48	20-60	20-60	25-35	1.40-1.60	0.60-2.00	0.15-0.19	3.0-5.9	0.5-2.0	.20	.24			
	48-68	30-60	30-50	12-25	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.28	.32			
	68-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.02-0.04	0.0-2.9	0.0-0.5	.43	.49			
BuzA:														
Brookston---------------	0-9	30-50	30-50	14-27	1.35-1.50	0.60-2.00	0.20-0.22	0.0-2.9	3.0-5.0	.24	.24	5	5	56
	9-48	20-60	20-60	25-35	1.40-1.60	0.60-2.00	0.15-0.19	3.0-5.9	0.5-2.0	.20	.24			
	48-68	30-60	30-50	12-25	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.28	.32			
	68-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.02-0.04	0.0-2.9	0.0-0.5	.43	.49			
Navunon-----------------	0-9	30-55	27-50	14-27	1.35-1.50	0.60-2.00	0.20-0.22	0.0-2.9	3.0-5.0	.24	.24	3	5	56
	9-24	20-60	25-60	15-35	1.40-1.60	0.60-2.00	0.15-0.19	3.0-5.9	0.5-2.0	.20	.24			
	24-43	40-60	30-32	10-20	1.60-1.75	0.06-0.20	0.08-0.15	0.0-2.9	0.0-0.5	.43	.49			
	43-80	---	---	---	---	0.00-0.20	---	---	---	---	---			
BwfA:														
Budd--------------------	0-15	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.24	.24	4	3	86
	15-38	74-76	14-17	7-15	1.60-1.80	2.00-6.00	0.10-0.18	0.0-2.9	0.5-1.0	.15	.15			
	38-52	25-90	10-65	5-15	1.60-1.80	20.00-20.00	0.05-0.10	0.0-2.9	0.0-0.5	.02	.05			
	52-80	40-48	38-45	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.5-1.0	.37	.43			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
BwfA:														
Brady	0-13	50-80	10-45	5-15	1.30-1.60	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	13-56	45-80	10-45	10-25	1.60-1.80	2.00-6.00	0.10-0.18	0.0-2.9	0.5-1.0	.15	.15			
	56-80	85-98	0-10	0-5	1.60-1.80	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.05			
CjfC:														
Chelsea	0-5	85-98	2-8	0-8	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.10	.10	5	1	250
	5-37	85-98	2-8	0-8	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-1.0	.10	.10			
	37-80	85-98	2-8	0-10	1.50-1.70	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.05	.05			
CjfD:														
Chelsea	0-5	85-98	2-8	0-8	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.10	.10	5	1	250
	5-37	85-98	2-8	0-8	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-1.0	.10	.10			
	37-80	85-98	2-8	0-10	1.50-1.70	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.05	.05			
CmbAI:														
Cohoctah	0-13	30-52	30-50	7-20	1.30-1.60	2.00-6.00	0.20-0.22	0.0-2.9	3.0-6.0	.24	.24	5	5	56
	13-56	40-70	10-40	5-25	1.50-1.70	2.00-6.00	0.15-0.19	0.0-2.9	0.5-2.0	.24	.24			
	56-80	85-98	2-8	0-10	1.60-1.80	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.05			
CnzAI:														
Cohoctah	0-13	30-52	30-50	7-20	1.30-1.60	2.00-6.00	0.20-0.22	0.0-2.9	3.0-6.0	.24	.24	5	5	56
	13-56	40-70	10-40	5-25	1.50-1.70	2.00-6.00	0.15-0.19	0.0-2.9	0.5-2.0	.24	.24			
	56-80	85-98	2-8	0-10	1.60-1.80	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.05			
Abscota	0-5	50-80	10-45	5-15	1.40-1.70	0.60-2.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	5	3	86
	5-14	70-98	0-25	0-10	1.35-1.60	6.00-20.00	0.05-0.11	0.0-2.9	0.5-1.0	.17	.17			
	14-60	85-100	0-10	0-10	1.45-1.60	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.0	.15	.15			
CpcA:														
Conover	0-11	30-52	30-50	11-22	1.30-1.60	0.60-2.00	0.20-0.22	0.0-2.9	2.0-4.0	.32	.32	4	5	56
	11-27	25-50	20-50	27-35	1.50-1.70	0.20-0.60	0.12-0.16	3.0-5.9	0.5-1.0	.37	.37			
	27-60	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.37	.43			
CqmA:														
Corwin	0-11	50-80	10-45	5-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.20	.20	4	3	86
	11-30	25-50	20-50	25-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-2.0	.28	.28			
	30-80	30-60	30-50	10-20	1.75-2.00	0.20-0.60	0.02-0.04	0.0-2.9	0.5-1.0	.32	.37			
CuyA:														
Crosier	0-11	50-80	10-45	5-15	1.40-1.70	0.60-2.00	0.16-0.18	0.0-2.9	1.0-3.0	.28	.28	4	3	86
	11-30	30-60	20-50	20-33	1.50-1.70	0.20-0.60	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	30-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.37	.43			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
DbsA:														
Denham------------------	0-9	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	9-49	88-95	2-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.0-0.5	.02	.02			
	49-80	85-98	2-5	0-10	1.50-1.70	6.00-20.00	0.05-0.10	0.0-2.9	0.0-0.5	.02	.02			
DbsB:														
Denham------------------	0-9	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	9-49	88-95	2-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.0-0.5	.02	.02			
	49-80	85-98	2-5	0-10	1.50-1.70	6.00-20.00	0.05-0.10	0.0-2.9	0.0-0.5	.02	.02			
EchAN:														
Edwards, drained--------	0-9	---	---	0-0	0.30-0.55	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	9-24	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---			
	24-80	---	---	3-35	---	0.06-0.20	0.00-0.00	0.0-2.9	0.0-20	---	---			
EchAU:														
Edwards, undrained------	0-24	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	24-80	---	---	3-35	---	0.06-0.20	0.00-0.00	0.0-2.9	0.0-20	---	---			
EcrAN:														
Edselton, drained-------	0-10	---	---	0-0	0.30-0.55	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	10-21	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---			
	21-48	7-37	50-70	12-25	---	0.06-0.20	0.00-0.00	0.0-2.9	0.0-20	---	---			
	48-80	75-98	0-25	0-10	1.40-1.75	6.00-20.00	0.03-0.08	0.0-2.9	0.0-1.0	.15	.15			
EcrAU:														
Edselton, undrained-----	0-21	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	21-48	7-37	50-70	12-25	---	0.06-0.20	0.00-0.00	0.0-2.9	0.0-20	---	---			
	48-80	75-98	0-25	0-10	1.40-1.75	6.00-20.00	0.03-0.08	0.0-2.9	0.0-1.0	.15	.15			
GcwA:														
Gilford-----------------	0-14	50-80	10-45	10-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	14-32	50-80	10-45	8-20	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	0.0-1.0	.10	.10			
	32-38	70-95	0-30	3-12	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.02	.02			
	38-80	75-98	0-25	1-10	1.60-1.80	6.00-20.00	0.02-0.07	0.0-2.9	0.0-0.5	.02	.02			
GdvA:														
Gilford-----------------	0-14	50-80	10-45	10-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	14-32	50-80	10-45	8-20	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	1.0-2.0	.17	.17			
	32-38	70-95	0-30	0-12	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.05	.05			
	38-80	75-98	0-25	0-10	1.60-1.80	6.00-20.00	0.02-0.07	0.0-2.9	0.0-0.5	.02	.05			
Monon-------------------	0-10	50-80	10-45	2-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.28	.28	3	3	86
	10-42	50-80	10-45	2-15	1.50-1.70	2.00-6.00	0.15-0.17	0.0-2.9	0.5-2.0	.28	.28			
	42-80	---	---	---	---	0.00-0.20	---	---	---	---	---			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
GmnA:														
Goodell-----------------	0-12	50-80	10-45	5-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.20	.20	4	3	86
	12-32	68-78	13-18	9-14	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	1.0-2.0	.17	.17			
	32-52	70-100	0-25	0-8	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.05	.05			
	52-80	50-52	36-38	12-12	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.43	.49			
Gilford-----------------	0-14	50-80	10-45	10-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	14-32	50-80	10-45	8-20	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	1.0-2.0	.17	.17			
	32-38	70-95	0-30	0-12	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.05	.05			
	38-80	75-98	0-25	0-10	1.60-1.80	6.00-20.00	0.02-0.07	0.0-2.9	0.0-0.5	.02	.05			
GrfA:														
Granby------------------	0-10	70-90	1-30	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	2.0-4.0	.10	.10	5	2	134
	10-32	70-98	0-25	0-10	1.45-1.65	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.8	.17	.17			
	32-80	85-100	0-10	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.17	.17			
GsaA:														
Granby------------------	0-10	70-90	1-30	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	2.0-4.0	.10	.10	5	2	134
	10-32	70-98	0-25	0-10	1.45-1.65	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.8	.17	.17			
	32-80	85-100	0-10	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.17	.17			
Gilford-----------------	0-14	50-80	10-45	10-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	14-32	50-80	10-45	8-20	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	1.0-2.0	.17	.17			
	32-38	70-95	0-30	0-12	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.05	.05			
	38-80	75-98	0-25	0-10	1.60-1.80	6.00-20.00	0.02-0.07	0.0-2.9	0.0-0.5	.02	.05			
HbzA:														
Headlee-----------------	0-9	50-80	10-45	5-20	1.30-1.60	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.37	.37	4	3	86
	9-22	30-60	15-50	15-35	1.50-1.70	0.60-2.00	0.15-0.20	3.0-5.9	0.5-1.0	.28	.28			
	22-42	5-30	30-60	27-60	1.70-1.90	0.01-0.20	0.11-0.19	6.0-8.9	0.5-1.0	.32	.37			
	42-50	70-95	0-30	0-10	1.50-1.70	6.00-20.00	0.05-0.10	0.0-2.9	0.0-0.5	.02	.02			
	50-80	2-20	40-70	12-60	1.40-1.75	0.06-0.20	0.10-0.16	3.0-8.9	0.5-1.0	.37	.37			
Brady-------------------	0-13	50-80	10-45	5-15	1.30-1.60	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	13-56	45-80	10-45	10-25	1.60-1.80	2.00-6.00	0.10-0.18	0.0-2.9	0.5-1.0	.15	.15			
	56-80	85-98	0-10	0-5	1.60-1.80	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.05			
HnbA:														
Homer-------------------	0-16	50-80	10-50	6-15	1.40-1.70	0.60-2.00	0.13-0.15	0.0-2.9	1.0-3.0	.32	.32	4	3	86
	16-22	25-75	5-50	20-35	1.50-1.70	0.60-2.00	0.12-0.18	3.0-5.9	0.5-1.0	.17	.20			
	22-35	45-75	5-40	17-27	1.50-1.70	0.60-2.00	0.10-0.18	0.0-2.9	0.5-1.0	.15	.20			
	35-80	70-98	1-25	1-10	1.60-1.80	20.00-20.00	0.01-0.04	0.0-2.9	0.0-0.5	.02	.10			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
HtbAN:														
Houghton, drained-------	0-9	---	---	---	0.30-0.55	0.20-6.00	0.35-0.45	---	50-99	---	---	3	2	134
	9-80	---	---	---	0.15-0.25	0.20-6.00	0.35-0.45	---	50-99	---	---			
HtbAU:														
Houghton, undrained-----	0-80	---	---	---	0.15-0.25	0.20-6.00	0.35-0.45	---	50-99	---	---	3	2	134
MfrAN:														
Madaus, drained---------	0-9	---	---	0-0	0.30-0.55	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	9-48	15-25	60-70	10-25	---	0.06-0.20	0.00-0.00	0.0-2.9	0.0-20	---	---			
	48-80	70-98	0-10	1-3	1.60-1.80	2.00-6.00	0.05-0.10	0.0-2.9	0.0-1.0	.17	.17			
MfrAU:														
Madaus, undrained-------	0-9	---	---	0-0	0.30-0.55	0.20-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	9-48	15-25	60-70	10-25	---	0.06-0.20	0.00-0.00	0.0-2.9	0.0-20	---	---			
	48-80	70-98	0-10	1-3	1.60-1.80	2.00-6.00	0.05-0.10	0.0-2.9	0.0-1.0	.17	.17			
MgyA:														
Maumee------------------	0-23	70-90	1-20	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	2.0-4.0	.05	.05	5	2	134
	23-61	70-98	1-20	2-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-1.0	.10	.10			
	61-80	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.10	.10			
Gilford-----------------	0-14	50-80	10-45	10-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	14-32	50-80	10-45	8-20	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	1.0-2.0	.17	.17			
	32-38	70-95	0-30	0-12	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.05	.05			
	38-80	75-98	0-25	0-10	1.60-1.80	6.00-20.00	0.02-0.07	0.0-2.9	0.0-0.5	.02	.05			
MgzA:														
Maumee------------------	0-23	70-90	1-20	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	2.0-4.0	.05	.05	5	2	134
	23-61	70-98	1-20	2-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-1.0	.10	.10			
	61-80	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.10	.10			
Gumz--------------------	0-12	50-80	10-45	5-20	1.50-1.80	6.00-20.00	0.16-0.18	0.0-2.9	2.0-4.0	.20	.20	4	2	134
	12-25	70-98	1-20	1-14	1.45-1.65	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.17	.17			
	25-50	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.17	.17			
	50-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.43	.49			
MhaA:														
Maumee------------------	0-23	70-90	1-20	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	2.0-4.0	.05	.05	5	2	134
	23-61	70-98	1-20	2-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-1.0	.10	.10			
	61-80	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.10	.10			
MhbA:														
Maumee------------------	0-10	70-90	1-20	2-10	1.10-1.40	6.00-20.00	0.15-0.18	0.0-2.9	8.0-14	.02	.02	5	2	134
	10-61	70-98	1-20	2-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-1.0	.10	.10			
	61-80	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.10	.10			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
MhnA:														
Medaryville-------------	0-11	50-80	10-45	5-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.28	.28	4	3	86
	11-32	60-90	1-45	1-15	1.40-1.60	0.20-0.60	0.09-0.17	0.0-2.9	0.5-1.0	.32	.32			
	32-36	85-100	0-15	0-10	1.50-1.70	0.20-0.60	0.06-0.08	0.0-2.9	0.0-0.5	.43	.43			
	36-80	0-20	40-70	27-60	1.40-1.75	0.01-0.20	0.10-0.16	6.0-8.9	0.0-1.0	.32	.37			
MlwB:														
Metea-------------------	0-9	70-90	5-25	3-8	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.17	.17	5	2	134
	9-28	70-100	0-25	0-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	28-32	45-70	10-50	12-22	1.50-1.70	0.60-2.00	0.15-0.19	0.0-2.9	0.0-0.5	.20	.20			
	32-44	30-60	20-50	24-35	1.50-1.70	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.37	.37			
	44-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.43			
Moon--------------------	0-9	70-90	5-25	3-8	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.17	.17	5	2	134
	9-23	70-100	0-25	0-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	23-35	45-70	10-50	15-34	1.50-1.70	0.60-2.00	0.15-0.19	0.0-2.9	0.0-0.5	.20	.20			
	35-45	30-60	20-50	20-34	1.50-1.70	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.37	.37			
	45-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.43			
MmyC2:														
Miami-------------------	0-8	50-80	10-45	8-15	1.30-1.60	0.60-2.00	0.16-0.18	0.0-2.9	1.0-3.0	.28	.28	4	3	86
	8-36	30-60	20-50	20-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	36-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.32	.37			
MnzB:														
Miami-------------------	0-8	50-80	10-45	8-15	1.30-1.60	0.60-2.00	0.16-0.18	0.0-2.9	1.0-3.0	.28	.28	4	3	86
	8-36	30-60	20-50	20-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	36-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.32	.37			
Williamstown------------	0-7	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	4	3	86
	7-34	30-60	20-50	20-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	34-56	30-60	30-50	15-27	1.50-1.70	0.20-0.60	0.08-0.15	0.0-2.9	0.0-1.0	.37	.43			
	56-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.0-0.5	.37	.49			
MouA:														
Milford-----------------	0-18	2-20	40-70	27-40	1.10-1.40	0.60-2.00	0.21-0.23	3.0-5.9	1.0-3.0	.28	.28	5	6	48
	18-50	2-30	40-70	35-42	1.40-1.60	0.20-0.60	0.11-0.20	3.0-5.9	0.5-2.0	.43	.43			
	50-60	2-30	40-70	20-42	1.40-1.75	0.20-0.60	0.10-0.22	3.0-5.9	0.0-1.0	.43	.43			
MtoA:														
Moon--------------------	0-9	70-90	5-25	3-8	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.17	.17	5	2	134
	9-23	70-100	0-25	0-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	23-35	45-70	10-50	15-34	1.50-1.70	0.60-2.00	0.15-0.19	0.0-2.9	0.0-0.5	.20	.20			
	35-45	30-60	20-50	20-34	1.50-1.70	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.37	.37			
	45-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.43			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
MtoA:														
Ormas-------------------	0-10	81-90	5-25	1-12	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.10	.10	4	2	134
	10-32	70-98	0-25	3-10	1.50-1.70	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.10	.10			
	32-50	45-80	5-48	10-25	1.50-1.70	2.00-6.00	0.09-0.15	0.0-2.9	0.5-1.0	.17	.24			
	50-80	85-98	0-10	1-5	1.50-1.70	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.10			
MtoB:														
Moon--------------------	0-9	70-90	5-25	3-8	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.17	.17	5	2	134
	9-23	70-100	0-25	0-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	23-35	45-70	10-50	15-34	1.50-1.70	0.60-2.00	0.15-0.19	0.0-2.9	0.0-0.5	.20	.20			
	35-45	30-60	20-50	20-34	1.50-1.70	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.37	.37			
	45-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.43			
Ormas-------------------	0-10	81-90	5-25	1-12	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.10	.10	4	2	134
	10-32	70-98	0-25	3-10	1.50-1.70	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.10	.10			
	32-50	45-80	5-48	10-25	1.50-1.70	2.00-6.00	0.09-0.15	0.0-2.9	0.5-1.0	.17	.24			
	50-80	85-98	0-10	1-5	1.50-1.70	20.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.10			
MtpA:														
Moon--------------------	0-9	70-90	5-25	3-8	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.17	.17	5	2	134
	9-23	70-100	0-25	0-10	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	23-35	45-70	10-50	15-34	1.50-1.70	0.60-2.00	0.15-0.19	0.0-2.9	0.0-0.5	.20	.20			
	35-45	30-60	20-50	20-34	1.50-1.70	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.37	.37			
	45-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.43			
Selfridge---------------	0-8	70-90	5-25	2-10	1.50-1.80	5.95-19.98	0.10-0.12	0.0-2.9	2.0-4.0	.17	.17	5	2	134
	8-25	70-98	1-20	2-15	1.40-1.60	5.95-19.98	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	25-29	30-70	15-50	5-35	1.60-1.75	0.20-0.60	0.12-0.19	0.0-2.9	0.5-1.0	.24	.24			
	29-32	10-50	30-60	20-35	1.60-1.75	0.20-0.60	0.15-0.20	3.0-5.9	0.5-1.0	.24	.24			
	32-80	30-52	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.5-1.0	.37	.43			
MupA:														
Morocco-----------------	0-9	70-90	1-15	1-10	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.05	.05	5	2	134
	9-60	70-100	0-15	1-10	1.50-1.70	6.00-20.00	0.05-0.11	0.0-2.9	0.0-0.5	.02	.02			
	60-80	85-100	0-10	1-6	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
MvhAN:														
Moston, drained---------	0-8	---	---	0-0	0.30-0.55	0.20-6.00	0.35-0.45	---	60-90	---	---	1	2	134
	8-24	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	60-90	---	---			
	24-48	---	---	18-35	0.30-1.10	0.06-0.20	0.18-0.24	3.0-5.9	1.0-40	.28	.28			
	48-80	75-98	0-10	0-10	1.40-1.75	6.00-20.00	0.02-0.07	0.0-2.9	0.0-1.0	.15	.15			
MvhAU:														
Moston, undrained-------	0-24	---	---	0-0	0.15-0.25	0.20-6.00	0.35-0.45	---	60-90	---	---	1	2	134
	24-48	---	---	18-35	0.30-1.10	0.06-0.20	0.18-0.24	3.0-5.9	1.0-40	.28	.28			
	48-80	75-98	0-10	0-10	1.40-1.75	6.00-20.00	0.02-0.07	0.0-2.9	0.0-1.0	.15	.15			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
MwzAN:														
Muskego, drained--------	0-9	---	---	0-0	0.30-0.55	0.60-6.00	0.35-0.45	---	60-90	---	---	1	2	134
	9-27	---	---	0-0	0.15-0.25	0.60-6.00	0.35-0.45	---	60-90	---	---			
	27-80	---	---	18-35	0.30-1.10	0.06-0.20	0.18-0.24	3.0-5.9	1.0-40	.28	.28			
MwzAU:														
Muskego, undrained------	0-27	---	---	0-0	0.15-0.25	0.60-6.00	0.35-0.45	---	60-90	---	---	1	2	134
	27-80	---	---	18-35	0.30-1.10	0.06-0.20	0.18-0.24	3.0-5.9	1.0-40	.28	.28			
NofA:														
Newton------------------	0-10	70-90	1-30	1-7	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	2.0-4.0	.05	.05	5	2	134
	10-15	70-100	0-25	2-7	1.50-1.70	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.10	.10			
	15-80	85-100	0-10	1-6	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
Morocco-----------------	0-9	70-90	1-15	1-10	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.05	.05	5	2	134
	9-60	70-100	0-15	1-10	1.50-1.70	6.00-20.00	0.05-0.11	0.0-2.9	0.0-0.5	.02	.02			
	60-80	85-100	0-10	1-6	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
OacA:														
Oakville----------------	0-3	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	3-59	88-98	0-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.5-1.0	.02	.02			
	59-80	88-100	0-8	0-10	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
Denham------------------	0-9	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	9-49	88-95	2-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.0-0.5	.02	.02			
	49-80	85-98	2-5	0-10	1.50-1.70	6.00-20.00	0.05-0.10	0.0-2.9	0.0-0.5	.02	.02			
OacB:														
Oakville----------------	0-3	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	3-59	88-98	0-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.5-1.0	.02	.02			
	59-80	88-100	0-8	0-10	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
Denham------------------	0-9	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	9-49	88-95	2-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.0-0.5	.02	.02			
	49-80	85-98	2-5	0-10	1.50-1.70	6.00-20.00	0.05-0.10	0.0-2.9	0.0-0.5	.02	.02			
OaeC:														
Oakville----------------	0-3	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	3-59	88-98	0-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.5-1.0	.02	.02			
	59-80	88-100	0-8	0-10	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
OaeD:														
Oakville----------------	0-3	88-95	2-8	0-10	1.40-1.70	6.00-20.00	0.07-0.09	0.0-2.9	0.5-2.0	.05	.05	5	1	250
	3-59	88-98	0-8	0-10	1.50-1.70	6.00-20.00	0.06-0.08	0.0-2.9	0.5-1.0	.02	.02			
	59-80	88-100	0-8	0-10	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
OeaA:														
Odell-------------------	0-11	50-80	10-45	5-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.32	.32	4	6	48
	11-31	25-50	20-50	25-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-2.0	.37	.37			
	31-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.32	.37			
OecA:														
Odell-------------------	0-11	50-80	10-45	5-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.32	.32	4	6	48
	11-31	25-50	20-50	25-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-2.0	.37	.37			
	31-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.32	.37			
Francesville------------	0-12	50-80	10-45	5-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.32	.32	4	6	48
	12-20	30-60	20-50	25-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-2.0	.37	.37			
	20-27	30-60	25-50	15-27	1.50-1.70	0.57-1.98	0.12-0.16	0.0-2.9	0.5-1.0	.37	.43			
	27-56	30-60	25-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.32	.37			
	56-80	---	---	---	---	0.00-0.20	---	---	---	---	---			
Pmg:														
Pits, gravel------------	0-80	---	0-8	0-8	1.45-1.75	6.00-20.00	0.02-0.09	0.0-2.9	0.0-0.5	---	---	-	---	---
Pps:														
Pits, quarries, limestone.														
RebA:														
Radioville--------------	0-18	30-50	30-50	14-27	1.30-1.60	0.60-2.00	0.20-0.22	0.0-2.9	3.0-6.0	.32	.32	5	5	56
	18-42	20-60	20-60	20-35	1.40-1.60	0.60-2.00	0.15-0.20	3.0-5.9	1.0-3.0	.24	.24			
	42-53	30-98	0-60	0-27	1.50-1.70	0.60-2.00	0.10-0.18	0.0-2.9	0.5-1.0	.37	.37			
	53-80	0-20	40-70	27-60	1.40-1.75	0.01-0.20	0.10-0.19	6.0-8.9	0.0-1.0	.32	.37			
Mermill-----------------	0-9	30-50	30-50	14-27	1.30-1.60	0.60-2.00	0.20-0.22	0.0-2.9	3.0-6.0	.28	.28	5	6	48
	9-28	20-60	20-60	18-35	1.50-1.70	0.60-2.00	0.15-0.19	3.0-5.9	0.5-2.0	.28	.28			
	28-57	0-20	40-70	27-60	1.60-1.80	0.01-0.20	0.11-0.19	6.0-8.9	0.5-1.0	.32	.37			
	57-80	0-20	40-70	27-60	1.40-1.75	0.01-0.20	0.10-0.16	6.0-8.9	0.5-1.0	.32	.37			
RevA:														
Rensselaer--------------	0-15	30-50	30-50	11-27	1.30-1.60	0.60-2.00	0.20-0.22	0.0-2.9	3.0-6.0	.24	.24	5	5	56
	15-38	20-60	20-60	20-35	1.40-1.60	0.60-2.00	0.15-0.20	3.0-5.9	1.0-3.0	.24	.24			
	38-42	20-60	20-60	15-30	1.40-1.60	0.60-2.00	0.15-0.19	3.0-5.9	0.5-1.0	.20	.20			
	42-76	30-98	0-60	5-20	1.50-1.70	0.60-2.00	0.10-0.18	0.0-2.9	0.5-1.0	.37	.37			
	76-80	30-60	30-50	10-20	1.60-1.75	0.06-0.20	0.08-0.15	0.0-2.9	0.0-0.5	.43	.49			
Radioville--------------	0-18	30-50	30-50	14-27	1.30-1.60	0.60-2.00	0.20-0.22	0.0-2.9	3.0-6.0	.32	.32	5	5	56
	18-42	20-60	20-60	20-35	1.40-1.60	0.60-2.00	0.15-0.20	3.0-5.9	1.0-3.0	.24	.24			
	42-53	30-98	0-60	0-27	1.50-1.70	0.60-2.00	0.10-0.18	0.0-2.9	0.5-1.0	.37	.37			
	53-80	0-20	40-70	27-60	1.40-1.75	0.01-0.20	0.10-0.19	6.0-8.9	0.0-1.0	.32	.37			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
ReyA:														
Rensselaer	0-15	30-50	30-50	11-27	1.30-1.60	0.60-2.00	0.20-0.22	0.0-2.9	3.0-6.0	.24	.24	5	5	56
	15-38	20-60	20-60	20-35	1.40-1.60	0.60-2.00	0.15-0.20	3.0-5.9	1.0-3.0	.24	.24			
	38-42	20-60	20-60	15-30	1.40-1.60	0.60-2.00	0.15-0.19	3.0-5.9	0.5-1.0	.20	.20			
	42-76	30-98	0-60	5-20	1.50-1.70	0.60-2.00	0.10-0.18	0.0-2.9	0.5-1.0	.37	.37			
	76-80	30-60	30-50	10-20	1.60-1.75	0.06-0.20	0.08-0.15	0.0-2.9	0.0-0.5	.43	.49			
RhcA:														
Riddles	0-8	50-80	10-45	4-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	5	3	86
	8-13	40-60	10-40	18-30	1.40-1.60	0.60-2.00	0.15-0.18	3.0-5.9	0.5-1.0	.32	.32			
	13-33	20-52	20-50	18-30	1.40-1.60	0.60-2.00	0.15-0.19	0.0-2.9	0.5-1.0	.32	.32			
	33-63	30-70	10-50	10-20	1.50-1.70	0.60-2.00	0.12-0.19	0.0-2.9	0.0-0.5	.37	.43			
	63-90	52-90	5-40	5-18	1.40-1.70	2.00-6.00	0.08-0.13	0.0-2.9	0.0-1.0	.24	.24			
	90-100	30-65	25-50	10-20	1.80-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.32	.37			
ScuA:														
Sebewa	0-14	30-50	30-50	10-25	1.10-1.60	0.60-2.00	0.20-0.22	0.0-2.9	2.0-12	.15	.15	4	5	56
	14-36	20-80	10-50	18-35	1.40-1.70	0.60-2.00	0.15-0.19	3.0-5.9	0.0-0.5	.32	.43			
	36-80	85-98	0-10	0-3	1.55-1.75	6.00-20.00	0.02-0.04	0.0-2.9	0.0-0.5	.10	.15			
SdzcB:														
Selfridge	0-8	70-90	5-25	2-10	1.50-1.80	5.95-19.98	0.10-0.12	0.0-2.9	2.0-4.0	.17	.17	5	2	134
	8-25	70-98	1-20	2-15	1.40-1.60	5.95-19.98	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	25-29	30-70	15-50	5-35	1.60-1.75	0.20-0.60	0.12-0.19	0.0-2.9	0.5-1.0	.24	.24			
	29-32	10-50	30-60	20-35	1.60-1.75	0.20-0.60	0.15-0.20	3.0-5.9	0.5-1.0	.24	.24			
	32-80	30-52	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.5-1.0	.37	.43			
Brems	0-9	70-90	1-15	2-10	1.50-1.80	6.00-20.00	0.10-0.12	0.0-2.9	2.0-4.0	.05	.05	5	2	134
	9-72	75-98	0-15	1-10	1.60-1.75	6.00-20.00	0.05-0.08	0.0-2.9	0.0-0.5	.02	.02			
	72-80	75-98	0-15	1-6	1.60-1.75	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
SgzA:														
Selfridge	0-8	70-90	5-25	2-10	1.50-1.80	5.95-19.98	0.10-0.12	0.0-2.9	2.0-4.0	.17	.17	5	2	134
	8-25	70-98	1-20	2-15	1.40-1.60	5.95-19.98	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	25-29	30-70	15-50	5-35	1.60-1.75	0.20-0.60	0.12-0.19	0.0-2.9	0.5-1.0	.24	.24			
	29-32	10-50	30-60	20-35	1.60-1.75	0.20-0.60	0.15-0.20	3.0-5.9	0.5-1.0	.24	.24			
	32-80	30-52	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.5-1.0	.37	.43			
ShaA:														
Selfridge	0-8	70-90	5-25	2-10	1.50-1.80	5.95-19.98	0.10-0.12	0.0-2.9	2.0-4.0	.17	.17	5	2	134
	8-25	70-98	1-20	2-15	1.40-1.60	5.95-19.98	0.06-0.11	0.0-2.9	0.0-0.5	.15	.15			
	25-29	30-70	15-50	5-35	1.60-1.75	0.20-0.60	0.12-0.19	0.0-2.9	0.5-1.0	.24	.24			
	29-32	10-50	30-60	20-35	1.60-1.75	0.20-0.60	0.15-0.20	3.0-5.9	0.5-1.0	.24	.24			
	32-80	30-52	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.5-1.0	.37	.43			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
ShaA:														
Morocco-----------------	0-9	70-90	1-15	1-10	1.40-1.70	6.00-20.00	0.10-0.12	0.0-2.9	0.5-2.0	.05	.05	5	2	134
	9-60	70-100	0-15	1-10	1.50-1.70	6.00-20.00	0.05-0.11	0.0-2.9	0.0-0.5	.02	.02			
	60-80	85-100	0-10	1-6	1.50-1.70	6.00-20.00	0.05-0.07	0.0-2.9	0.0-0.5	.02	.02			
SmsAK:														
Sloan-------------------	0-15	10-40	50-70	15-27	1.30-1.60	0.60-2.00	0.22-0.24	0.0-2.9	3.0-6.0	.28	.28	5	6	48
	15-45	10-40	40-70	22-35	1.25-1.55	0.20-2.00	0.15-0.19	3.0-5.9	0.5-1.0	.37	.37			
	45-80	20-60	30-60	10-30	1.20-1.50	0.20-2.00	0.13-0.18	0.0-2.9	0.0-0.5	.37	.43			
SnlA:														
Southwest---------------	0-10	10-20	50-70	18-27	1.30-1.60	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	10-23	5-20	50-70	18-39	1.40-1.70	0.60-2.00	0.18-0.22	0.0-5.9	1.0-3.0	.37	.37			
	23-34	5-30	40-70	18-39	1.40-1.70	0.20-0.60	0.20-0.24	0.0-5.9	3.0-6.0	.28	.28			
	34-45	5-30	40-70	18-35	1.40-1.70	0.20-0.60	0.17-0.22	0.0-5.9	0.5-1.0	.37	.37			
	45-75	5-30	40-70	18-35	1.40-1.70	0.20-0.60	0.21-0.24	0.0-5.9	2.0-5.0	.28	.28			
	75-80	5-30	40-70	15-32	1.40-1.75	0.20-0.60	0.08-0.22	0.0-5.9	0.0-1.0	.43	.43			
SwiA:														
Strole------------------	0-12	5-30	50-70	20-27	1.30-1.60	0.60-2.00	0.20-0.24	0.0-2.9	2.0-4.0	.37	.37	3	6	48
	12-29	0-20	40-60	40-60	1.40-1.60	0.06-0.20	0.11-0.13	6.0-8.9	1.0-3.0	.24	.24			
	29-60	0-20	40-60	40-60	1.40-1.60	0.06-0.20	0.10-0.12	6.0-8.9	0.5-1.0	.37	.37			
	60-80	0-20	40-70	27-60	1.40-1.75	0.06-0.20	0.10-0.16	6.0-8.9	0.5-1.0	.37	.37			
SwxA:														
Sumava------------------	0-12	50-80	10-45	8-12	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.17	.17	5	3	86
	12-36	50-80	10-45	8-15	1.50-1.70	2.00-6.00	0.15-0.17	0.0-2.9	0.5-1.0	.20	.20			
	36-63	40-55	30-50	8-15	1.50-1.70	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.32	.37			
	63-79	70-95	2-25	0-10	1.35-1.60	5.95-19.98	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
	79-82	40-55	30-50	8-15	1.50-1.70	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.32	.37			
TmaAN:														
Toto, drained-----------	0-9	---	---	0-0	0.30-0.55	0.60-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	9-24	---	---	0-0	0.30-0.40	0.60-6.00	0.35-0.45	---	55-75	---	---			
	24-30	---	---	0-0	0.50-1.10	0.06-0.20	0.18-0.24	3.0-5.9	5.0-20	---	---			
	30-38	---	---	0-3	0.30-0.50	0.06-0.20	0.00-0.00	0.0-2.9	1.0-3.0	---	---			
	38-80	85-100	0-15	0-10	1.60-1.80	6.00-20.00	0.05-0.07	0.0-2.9	0.5-2.0	.15	.15			
TmaAU:														
Toto, undrained---------	0-24	---	---	0-0	0.30-0.60	0.60-6.00	0.35-0.45	---	55-75	---	---	1	2	134
	24-30	---	---	0-0	0.50-1.10	0.06-0.20	0.18-0.24	3.0-5.9	5.0-20	---	---			
	30-38	---	---	0-3	0.30-0.50	0.06-0.20	0.00-0.00	0.0-2.9	1.0-3.0	---	---			
	38-80	85-100	0-15	0-10	1.60-1.80	6.00-20.00	0.05-0.07	0.0-2.9	0.5-2.0	.15	.15			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
UbrA:														
Udorthents, clayey------	0-80	---	---	27-40	1.70-1.90	0.01-0.20	0.04-0.10	3.0-5.9	0.0-1.0	---	---	-	7	38
W:														
Water.														
WmgA:														
Whiskerville------------	0-9	50-80	10-45	5-20	1.30-1.60	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.32	.32	4	3	86
	9-42	50-80	10-45	10-25	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-0.5	.24	.24			
	42-80	0-20	40-70	27-60	1.40-1.75	0.01-0.20	0.10-0.16	6.0-8.9	0.0-1.0	.32	.37			
Bronson-----------------	0-9	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.13-0.15	0.0-2.9	1.0-3.0	.15	.15	4	3	86
	9-20	50-80	10-45	2-15	1.35-1.60	1.98-5.95	0.12-0.14	0.0-2.9	0.0-0.5	.24	.24			
	20-43	45-80	10-45	10-25	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-0.5	.24	.24			
	43-56	70-95	2-25	2-10	1.35-1.60	5.95-19.98	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
	56-80	85-98	0-10	0-5	1.50-1.65	5.95-19.98	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10			
WmiA:														
Whitepost---------------	0-12	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.24	.24	4	3	86
	12-25	50-80	10-45	10-20	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	0.5-2.0	.28	.28			
	25-40	50-85	3-45	3-20	1.60-1.80	6.00-20.00	0.09-0.17	0.0-2.9	0.5-1.0	.05	.05			
	40-54	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.17	.17			
	54-80	0-20	40-70	27-60	1.40-1.75	0.01-0.20	0.10-0.16	6.0-8.9	0.0-1.0	.32	.37			
Gilford-----------------	0-14	50-80	10-45	10-20	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	2.0-4.0	.15	.15	4	3	86
	14-32	50-80	10-45	8-20	1.50-1.70	2.00-6.00	0.12-0.17	0.0-2.9	1.0-2.0	.17	.17			
	32-38	70-95	0-30	0-12	1.60-1.80	6.00-20.00	0.06-0.11	0.0-2.9	0.5-1.0	.05	.05			
	38-80	75-98	0-25	0-10	1.60-1.80	6.00-20.00	0.02-0.07	0.0-2.9	0.0-0.5	.02	.05			
WoeB:														
Williamstown------------	0-7	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	4	3	86
	7-34	30-60	20-50	20-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	34-56	30-60	30-50	15-27	1.50-1.70	0.20-0.60	0.08-0.15	0.0-2.9	0.0-1.0	.37	.43			
	56-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.0-0.5	.37	.49			
Crosier-----------------	0-11	50-80	10-45	5-15	1.40-1.70	0.60-2.00	0.16-0.18	0.0-2.9	1.0-3.0	.28	.28	4	3	86
	11-30	30-60	20-50	20-33	1.50-1.70	0.20-0.60	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	30-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.5-1.0	.37	.43			
WogA:														
Williamstown------------	0-7	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	4	3	86
	7-34	30-60	20-50	20-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	34-56	30-60	30-50	15-27	1.50-1.70	0.20-0.60	0.08-0.15	0.0-2.9	0.0-1.0	.37	.43			
	56-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.0-0.5	.37	.49			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
WoxA:														
Williamstown------------	0-7	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	4	3	86
	7-34	30-60	20-50	20-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	34-56	30-60	30-50	15-27	1.50-1.70	0.20-0.60	0.08-0.15	0.0-2.9	0.0-1.0	.37	.43			
	56-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.0-0.5	.37	.49			
Winamac-----------------	0-12	50-80	10-45	4-14	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.32	.32	4	3	86
	12-44	50-80	10-45	10-22	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-1.0	.24	.24			
	44-58	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.17	.17			
	58-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.49			
WoxB:														
Williamstown------------	0-7	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.28	.28	4	3	86
	7-34	30-60	20-50	20-35	1.50-1.70	0.60-2.00	0.12-0.16	3.0-5.9	0.5-1.0	.32	.32			
	34-56	30-60	30-50	15-27	1.50-1.70	0.20-0.60	0.08-0.15	0.0-2.9	0.0-1.0	.37	.43			
	56-80	30-60	30-50	10-20	1.75-2.00	0.01-0.20	0.02-0.04	0.0-2.9	0.0-0.5	.37	.49			
Winamac-----------------	0-12	50-80	10-45	4-14	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.32	.32	4	3	86
	12-44	50-80	10-45	10-22	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-1.0	.24	.24			
	44-58	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.17	.17			
	58-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.49			
WpaA:														
Winamac-----------------	0-12	50-80	10-45	4-14	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.32	.32	4	3	86
	12-44	50-80	10-45	10-22	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-1.0	.24	.24			
	44-58	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.17	.17			
	58-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.49			
Bronson-----------------	0-9	50-80	10-45	5-15	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-3.0	.15	.15	4	3	86
	9-20	50-80	10-45	2-15	1.35-1.60	1.98-5.95	0.12-0.14	0.0-2.9	0.0-0.5	.24	.24			
	20-43	45-80	10-45	10-25	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-0.5	.24	.24			
	43-56	70-95	2-25	2-10	1.35-1.60	5.95-19.98	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17			
	56-80	85-98	0-10	0-5	1.50-1.65	5.95-19.98	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10			
WpbA:														
Winamac-----------------	0-12	50-80	10-45	4-14	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.32	.32	4	3	86
	12-44	50-80	10-45	10-22	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-1.0	.24	.24			
	44-58	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.17	.17			
	58-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.49			
WpbB:														
Winamac-----------------	0-12	50-80	10-45	4-14	1.40-1.70	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.32	.32	4	3	86
	12-44	50-80	10-45	10-22	1.35-1.60	1.98-5.95	0.12-0.18	0.0-2.9	0.0-1.0	.24	.24			
	44-58	85-100	0-15	0-10	1.45-1.65	6.00-20.00	0.05-0.07	0.0-2.9	0.0-1.0	.17	.17			
	58-80	30-60	30-50	10-20	1.60-1.75	0.20-0.60	0.08-0.15	0.0-2.9	0.0-0.5	.37	.49			

Table 20.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
WrxAN:														
Wunabuna----------------	0-21	8-20	50-70	20-27	1.30-1.60	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.37	.37	5	6	48
	21-32	0-20	40-70	20-40	1.20-1.45	0.60-2.00	0.18-0.22	3.0-5.9	1.0-2.0	.32	.32			
	32-38	0-20	40-70	20-50	1.20-1.45	0.60-2.00	0.18-0.22	3.0-5.9	4.0-8.0	.24	.24			
	38-80	---	---	0-0	0.25-0.75	0.60-6.00	0.35-0.45	0.0-2.9	60-90	---	---			

Table 21.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
AadAK:				
Abscota---------	0-5	6.1-7.3	4.0-15	0
	5-14	6.1-7.8	4.0-8.0	0-15
	14-60	6.1-8.4	1.0-2.0	0-30
AatAN:				
Ackerman, drained--------	0-8	6.6-7.3	125-200	0
	8-14	5.6-7.8	15-50	0-20
	14-80	6.6-8.4	2.0-5.0	0-40
AatAU:				
Ackerman, undrained------	0-8	6.6-7.3	125-200	0
	8-14	5.6-7.8	15-50	0-20
	14-80	6.6-8.4	2.0-5.0	0-40
AbhAN:				
Adrian, drained	0-9	5.1-7.3	150-200	0
	9-34	5.1-7.3	150-200	0
	34-80	6.1-8.4	1.0-3.0	0-40
AbhAU:				
Adrian, undrained------	0-34	5.1-7.3	150-200	0
	34-80	6.1-8.4	1.0-3.0	0-40
ApuAN:				
Antung, drained	0-9	5.1-7.3	150-200	0
	9-12	5.1-7.3	150-200	0
	12-80	5.6-8.4	1.0-3.0	0-40
ApuAU:				
Antung, undrained------	0-12	5.1-7.3	150-200	0
	12-80	5.6-8.4	1.0-3.0	0-40
BrvA:				
Brady-----------	0-13	6.1-7.3	13-20	0
	13-56	5.1-7.3	4.0-14	0
	56-80	6.6-8.4	0.0-4.0	0-40
BstA:				
Brems-----------	0-9	6.1-7.3	5.0-14	0
	9-72	4.5-6.0	1.0-5.0	0
	72-80	5.1-6.5	1.0-3.0	0
BstB:				
Brems-----------	0-9	6.1-7.3	5.0-14	0
	9-72	4.5-6.0	1.0-5.0	0
	72-80	5.1-6.5	1.0-3.0	0
BswA:				
Brems-----------	0-9	6.1-7.3	5.0-14	0
	9-72	4.5-6.0	1.0-5.0	0
	72-80	5.1-6.5	1.0-3.0	0

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
BswA:				
Morocco---------	0-9	5.1-6.5	1.0-8.0	0
	9-60	4.5-6.0	1.0-5.0	0
	60-80	4.5-6.0	1.0-3.0	0
BupB:				
Bronson---------	0-9	5.6-7.3	5.0-15	0
	9-20	5.1-7.3	2.0-10	0
	20-43	5.1-7.3	4.0-15	0
	43-56	5.1-7.3	1.0-5.0	0
	56-80	6.6-8.4	1.0-2.0	0-40
BuuA:				
Brookston-------	0-9	6.1-7.3	20-24	0
	9-48	6.1-7.8	8.0-20	0
	48-68	6.1-8.4	3.0-16	0-15
	68-80	7.4-8.4	2.0-9.0	15-35
BuzA:				
Brookston-------	0-9	6.1-7.3	20-24	0
	9-48	6.1-7.8	8.0-20	0
	48-68	6.1-8.4	3.0-16	0-15
	68-80	7.4-8.4	2.0-9.0	15-35
Navunon---------	0-9	6.1-7.3	20-24	0
	9-24	6.1-7.8	8.0-20	0
	24-43	7.4-8.4	2.0-9.0	15-35
	43-80	---	---	---
BwfA:				
Budd------------	0-15	5.6-7.3	4.0-15	0
	15-38	5.1-7.3	4.0-14	0-35
	38-52	6.6-8.4	0.0-4.0	0-55
	52-80	7.4-8.4	5.0-14	15-40
Brady-----------	0-13	6.1-7.3	13-20	0
	13-56	5.1-7.3	4.0-14	0
	56-80	6.6-8.4	0.0-4.0	0-55
CjfC:				
Chelsea---------	0-5	5.6-7.3	2.0-7.0	0
	5-37	5.6-7.3	2.0-7.0	0
	37-80	5.1-6.5	2.0-7.0	0
CjfD:				
Chelsea---------	0-5	5.6-7.3	2.0-7.0	0
	5-37	5.6-7.3	2.0-7.0	0
	37-80	5.1-6.5	2.0-7.0	0
CmbAI:				
Cohoctah--------	0-13	6.1-7.8	10-24	0-15
	13-56	6.1-8.4	3.0-19	0-20
	56-80	7.4-8.4	1.0-7.0	15-40
CnzAI:				
Cohoctah--------	0-13	6.1-7.8	10-24	0-15
	13-56	6.1-8.4	3.0-19	0-20
	56-80	7.4-8.4	1.0-7.0	15-40
Abscota---------	0-5	6.1-7.3	4.0-15	0
	5-14	6.1-7.8	4.0-8.0	0-15
	14-60	6.1-8.4	1.0-2.0	0-30

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
CpcA:				
Conover---------	0-11	5.6-6.5	8.0-21	0
	11-27	5.6-7.3	11-23	0
	27-60	7.4-8.4	4.0-15	15-40
CqmA:				
Corwin----------	0-11	5.6-7.3	4.0-15	0
	11-30	5.1-6.5	11-25	0-20
	30-80	7.9-8.4	5.0-14	15-40
CuyA:				
Crosier---------	0-11	5.6-7.3	4.0-15	0
	11-30	5.1-7.3	9.0-22	0
	30-80	7.4-8.4	5.0-14	15-40
DbsA:				
Denham----------	0-9	4.5-7.3	1.0-10	0
	9-49	4.5-7.3	1.0-7.0	0
	49-80	5.6-7.3	1.0-7.0	0
DbsB:				
Denham----------	0-9	4.5-7.3	1.0-10	0
	9-49	4.5-7.3	1.0-7.0	0
	49-80	5.6-7.3	1.0-7.0	0
EchAN:				
Edwards, drained	0-9	6.1-7.8	150-230	0
	9-24	6.1-7.8	150-230	0
	24-80	7.4-8.4	1.0-10	50-90
EchAU:				
Edwards, undrained------	0-24	6.1-7.8	150-230	0
	24-80	7.4-8.4	1.0-10	50-90
EcrAN:				
Edselton, drained--------	0-10	5.1-7.8	150-200	0
	10-21	5.1-7.8	150-200	0
	21-48	7.8-8.4	1.0-10	50-90
	48-80	7.8-8.4	1.0-7.0	0-40
EcrAU:				
Edselton, undrained------	0-21	5.1-7.8	150-200	0
	21-48	7.8-8.4	1.0-10	50-90
	48-80	7.8-8.4	1.0-7.0	0-40
GcwA:				
Gilford---------	0-14	5.6-7.3	6.0-20	0
	14-32	5.6-7.3	4.0-14	0
	32-38	6.1-7.3	1.0-9.0	0
	38-80	6.6-8.4	1.0-6.0	0-30
GdvA:				
Gilford---------	0-14	5.6-7.3	8.0-20	0
	14-32	5.6-7.3	4.0-16	0
	32-38	6.1-7.3	2.0-9.0	0
	38-80	6.6-8.4	1.0-7.0	0-40
Monon-----------	0-10	6.1-6.5	6.0-17	0
	10-42	6.1-7.3	5.0-16	0
	42-80	---	---	---

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
GmnA:				
Goodell---------	0-12	5.6-7.3	8.0-20	0
	12-32	5.6-7.3	4.0-16	0
	32-52	7.4-8.4	2.0-9.0	15-40
	52-80	7.4-8.4	2.0-9.0	15-35
Gilford---------	0-14	5.6-7.3	8.0-20	0
	14-32	5.6-7.3	4.0-16	0
	32-38	6.1-7.3	2.0-9.0	0-20
	38-80	6.6-8.4	1.0-7.0	0-40
GrfA:				
Granby----------	0-10	6.1-7.3	5.0-14	0
	10-32	5.6-7.8	1.0-10	0
	32-80	6.6-8.4	1.0-3.0	0
GsaA:				
Granby----------	0-10	6.1-7.3	5.0-14	0
	10-32	5.6-7.8	1.0-10	0
	32-80	6.6-8.4	1.0-3.0	0
Gilford---------	0-14	5.6-7.3	8.0-20	0
	14-32	5.6-7.3	4.0-16	0
	32-38	6.1-7.3	2.0-9.0	0-20
	38-80	6.6-8.4	1.0-7.0	0-40
HbzA:				
Headlee---------	0-9	6.1-7.3	13-20	0
	9-22	5.1-7.3	8.0-23	0
	22-42	6.1-8.4	14-35	0-30
	42-50	5.6-7.3	0.0-7.0	0
	50-80	7.4-8.4	12-38	5-40
Brady-----------	0-13	6.1-7.3	13-20	0
	13-56	5.1-7.3	4.0-14	0-35
	56-80	6.6-8.4	0.0-4.0	0-55
HnbA:				
Homer-----------	0-16	5.1-7.3	4.0-15	0
	16-22	5.1-6.5	9.0-23	0
	22-35	5.1-7.3	8.0-18	0
	35-80	7.4-8.4	0.0-7.0	25-55
HtbAN:				
Houghton, drained--------	0-9	4.5-7.8	130-200	0
	9-80	4.5-7.8	130-200	0
HtbAU:				
Houghton, undrained------	0-80	4.5-7.8	130-200	0
MfrAN:				
Madaus, drained	0-9	6.1-8.4	150-200	0
	9-48	7.4-8.4	1.0-10	50-90
	48-80	7.4-8.4	1.0-3.0	0-40
MfrAU:				
Madaus, undrained------	0-9	5.1-7.3	150-200	0
	9-48	7.4-8.4	1.0-10	50-90
	48-80	7.4-8.4	1.0-3.0	0-40

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
MgyA:				
Maumee	0-23	5.6-7.8	5.0-14	0
	23-61	5.6-7.3	1.0-8.0	0
	61-80	6.1-8.4	1.0-3.0	0-40
Gilford	0-14	5.6-7.3	8.0-20	0
	14-32	5.6-7.3	4.0-16	0
	32-38	6.1-7.3	2.0-9.0	0
	38-80	6.6-8.4	1.0-7.0	0-40
MgzA:				
Maumee	0-23	5.6-7.8	5.0-14	0
	23-61	5.6-7.3	1.0-8.0	0
	61-80	6.1-8.4	1.0-3.0	0-40
Gumz	0-12	5.6-7.3	5.0-14	0
	12-25	5.6-7.8	1.0-10	0
	25-50	7.4-8.4	1.0-3.0	15-35
	50-80	7.4-8.4	2.0-9.0	15-35
MhaA:				
Maumee	0-23	5.6-7.8	5.0-14	0
	23-61	5.6-7.3	1.0-8.0	0
	61-80	6.1-8.4	1.0-3.0	0-40
MhbA:				
Maumee	0-10	5.6-7.8	17-34	0
	10-61	5.6-7.3	1.0-8.0	0
	61-80	6.1-8.4	1.0-3.0	0-40
MhnA:				
Medaryville	0-11	5.6-7.3	9.0-20	0
	11-32	5.6-7.3	9.0-23	0
	32-36	6.6-8.4	2.0-7.0	0-40
	36-80	7.4-8.4	11-26	15-30
MlwB:				
Metea	0-9	5.6-7.3	2.0-9.0	0
	9-28	5.1-6.5	1.0-7.0	0
	28-32	5.6-6.5	6.0-15	0
	32-44	5.6-7.3	11-23	0
	44-80	5.6-8.4	5.0-14	0-40
Moon	0-9	5.6-7.3	2.0-9.0	0
	9-23	4.5-7.3	1.0-7.0	0
	23-35	5.1-7.3	6.0-15	0
	35-45	5.6-7.3	11-23	0
	45-80	7.4-8.4	5.0-14	0-40
MmyC2:				
Miami	0-8	5.6-7.3	5.0-18	0
	8-36	5.1-6.0	9.0-23	0
	36-80	7.4-8.4	5.0-14	15-40
MnzB:				
Miami	0-8	5.6-7.3	5.0-18	0
	8-36	5.1-6.0	9.0-23	0
	36-80	7.4-8.4	5.0-14	15-40
Williamstown	0-7	5.6-7.3	3.0-13	0
	7-34	5.1-6.0	9.0-23	0
	34-56	6.6-8.4	6.0-16	0-40
	56-80	7.4-8.4	2.0-9.0	15-40

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
MouA:				
Milford---------	0-18	5.6-7.3	14-28	0
	18-50	5.6-7.8	22-29	0-15
	50-60	6.6-8.4	4.0-18	0-30
MtoA:				
Moon------------	0-9	5.6-7.3	2.0-9.0	0
	9-23	4.5-7.3	1.0-7.0	0
	23-35	5.1-7.3	6.0-15	0
	35-45	5.6-7.3	11-23	0
	45-80	7.4-8.4	5.0-14	0-40
Ormas-----------	0-10	5.6-7.3	4.0-13	0
	10-32	5.6-6.5	2.0-8.0	0
	32-50	5.1-6.5	4.0-17	0
	50-80	7.4-8.4	1.0-6.0	15-40
MtoB:				
Moon------------	0-9	5.6-7.3	2.0-9.0	0
	9-23	4.5-7.3	1.0-7.0	0
	23-35	5.1-7.3	6.0-15	0
	35-45	5.6-7.3	11-23	0
	45-80	7.4-8.4	5.0-14	0-40
Ormas-----------	0-10	5.6-7.3	4.0-13	0
	10-32	5.6-6.5	2.0-8.0	0
	32-50	5.1-6.5	4.0-17	0
	50-80	7.4-8.4	1.0-6.0	15-40
MtpA:				
Moon------------	0-9	5.6-7.3	2.0-9.0	0
	9-23	4.5-7.3	1.0-7.0	0
	23-35	5.1-7.3	6.0-15	0
	35-45	5.6-7.3	11-23	0
	45-80	7.4-8.4	5.0-14	0-40
Selfridge-------	0-8	6.1-7.3	5.0-14	0
	8-25	5.1-7.3	1.0-10	0
	25-29	5.6-7.3	1.0-23	0
	29-32	5.6-7.3	7.0-23	0
	32-80	7.4-8.4	5.0-14	15-40
MupA:				
Morocco---------	0-9	5.1-6.5	1.0-8.0	0
	9-60	4.5-6.0	1.0-5.0	0
	60-80	4.5-6.0	1.0-3.0	0
MvhAN:				
Moston, drained	0-8	5.6-7.3	140-180	0
	8-24	5.6-7.3	140-180	0
	24-48	5.6-7.8	10-45	0-20
	48-80	6.6-8.4	1.0-3.0	0-40
MvhAU:				
Moston, undrained------	0-24	5.6-7.3	140-180	0
	24-48	5.6-7.8	10-45	0-20
	48-80	6.6-8.4	1.0-3.0	0-40
MwzAN:				
Muskego, drained	0-9	5.6-7.3	140-190	0
	9-27	5.6-7.3	140-190	0
	27-80	6.6-8.4	10-45	0-20

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
MwzAU:				
Muskego, undrained------	0-27	5.6-7.3	140-190	0
	27-80	6.6-8.4	10-45	0-20
NofA:				
Newton----------	0-10	4.5-6.0	5.0-14	0
	10-15	4.5-5.5	1.0-5.0	0
	15-80	4.5-6.0	1.0-3.0	0
Morocco---------	0-9	5.1-6.5	1.0-8.0	0
	9-60	4.5-6.0	1.0-5.0	0
	60-80	4.5-6.0	1.0-3.0	0
OacA:				
Oakville--------	0-3	4.5-7.3	1.0-10	0
	3-59	4.5-7.3	1.0-8.0	0
	59-80	4.5-7.3	1.0-7.0	0
Denham----------	0-9	4.5-7.3	1.0-10	0
	9-49	4.5-7.3	1.0-7.0	0
	49-80	4.5-7.3	1.0-7.0	0
OacB:				
Oakville--------	0-3	4.5-7.3	1.0-10	0
	3-59	4.5-7.3	1.0-8.0	0
	59-80	4.5-7.3	1.0-7.0	0
Denham----------	0-9	4.5-7.3	1.0-10	0
	9-49	4.5-7.3	1.0-7.0	0
	49-80	4.5-7.3	1.0-7.0	0
OaeC:				
Oakville--------	0-3	4.5-7.3	1.0-10	0
	3-59	4.5-7.3	1.0-8.0	0
	59-80	4.5-7.3	1.0-7.0	0
OaeD:				
Oakville--------	0-3	4.5-7.3	1.0-10	0
	3-59	4.5-7.3	1.0-8.0	0
	59-80	4.5-7.3	1.0-7.0	0
OeaA:				
Odell-----------	0-11	5.6-7.3	11-24	0
	11-31	5.6-7.3	11-25	0
	31-80	7.4-8.4	5.0-14	15-40
OecA:				
Odell-----------	0-11	5.6-7.3	11-24	0
	11-31	5.6-7.3	11-25	0
	31-80	7.4-8.4	5.0-14	15-40
Francesville----	0-12	5.6-7.3	11-24	0
	12-20	5.6-7.3	11-25	0
	20-27	5.6-7.3	5.0-14	0
	27-56	7.4-8.4	5.0-14	15-40
	56-80	---	---	---
Pmg:				
Pits, gravel----	0-80	6.6-8.4	0.0-6.0	0-40

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
Pps:				
Pits, quarries, limestone.				
RebA:				
Radioville------	0-18	6.1-7.3	11-28	0
	18-42	6.1-7.3	10-27	0
	42-53	6.6-8.4	4.0-14	0-40
	53-80	7.4-8.4	11-26	15-35
Mermill---------	0-9	5.6-7.3	12-28	0
	9-28	5.6-7.3	8.0-25	0
	28-57	6.6-8.4	12-26	0-40
	57-80	7.4-8.4	12-26	15-35
RevA:				
Rensselaer------	0-15	6.1-7.3	11-28	0
	15-38	6.1-7.3	10-27	0
	38-42	6.6-7.8	9.0-20	0-20
	42-76	7.4-8.4	4.0-14	15-40
	76-80	7.4-8.4	2.0-9.0	15-35
Radioville------	0-18	6.1-7.3	11-28	0
	18-42	6.1-7.3	10-27	0
	42-53	6.6-8.4	4.0-14	0-40
	53-80	7.4-8.4	11-26	15-35
ReyA:				
Rensselaer------	0-15	6.1-7.3	11-28	0
	15-38	6.1-7.3	10-27	0
	38-42	6.6-7.8	9.0-20	0-20
	42-76	7.4-8.4	4.0-14	15-40
	76-80	7.4-8.4	2.0-9.0	15-35
RhcA:				
Riddles---------	0-8	5.6-7.3	3.0-13	0
	8-13	4.5-7.3	7.0-20	0
	13-33	6.6-7.8	6.0-18	0-25
	33-63	7.4-8.4	4.0-14	15-35
	63-90	5.1-7.3	2.0-11	0
	90-100	7.4-8.4	5.0-14	15-40
ScuA:				
Sebewa----------	0-14	6.1-7.8	5.0-35	0-15
	14-36	6.1-7.8	3.0-15	0-15
	36-80	7.4-8.4	1.0-2.0	10-25
SdzcB:				
Selfridge-------	0-8	6.1-7.3	5.0-14	0
	8-25	5.1-7.3	1.0-10	0
	25-29	5.6-7.3	1.0-23	0
	29-32	5.6-7.3	7.0-23	0
	32-80	7.4-8.4	5.0-14	15-40
Brems-----------	0-9	6.1-7.3	5.0-14	0
	9-72	4.5-6.0	1.0-5.0	0
	72-80	5.1-6.5	1.0-3.0	0

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
SgzA:				
Selfridge-------	0-8	6.1-7.3	5.0-14	0
	8-25	5.1-7.3	1.0-10	0
	25-29	5.6-7.3	1.0-23	0
	29-32	5.6-7.3	7.0-23	0
	32-80	7.4-8.4	5.0-14	15-40
ShaA:				
Selfridge-------	0-8	6.1-7.3	5.0-14	0
	8-25	5.1-7.3	1.0-10	0
	25-29	5.6-7.3	1.0-23	0
	29-32	5.6-7.3	7.0-23	0
	32-80	7.4-8.4	5.0-14	15-40
Morocco---------	0-9	5.1-6.5	1.0-8.0	0
	9-60	4.5-6.0	1.0-5.0	0
	60-80	4.5-6.0	1.0-3.0	0
SmsAK:				
Sloan-----------	0-15	6.1-7.8	13-26	0-15
	15-45	6.1-8.4	10-20	0-20
	45-80	6.6-8.4	4.0-18	5-40
SnlA:				
Southwest-------	0-10	6.1-7.3	10-15	0
	10-23	6.1-7.3	10-15	0
	23-34	6.1-7.3	20-36	0
	34-45	6.1-7.3	10-20	0
	45-75	6.1-7.8	10-33	0-15
	75-80	7.4-8.4	2.0-15	5-25
SwiA:				
Strole----------	0-12	5.6-7.3	12-24	0
	12-29	5.6-7.8	18-42	0-20
	29-60	7.4-8.4	15-38	15-40
	60-80	7.4-8.4	15-38	10-45
SwxA:				
Sumava----------	0-12	6.1-7.3	7.0-15	0
	12-36	6.1-7.8	4.0-11	0-15
	36-63	7.4-8.4	3.0-10	10-40
	63-79	7.4-8.4	1.0-5.0	10-40
	79-82	7.4-8.4	3.0-10	10-40
TmaAN:				
Toto, drained---	0-9	5.6-7.3	150-200	0
	9-24	5.6-7.3	150-200	0
	24-30	6.6-7.8	15-50	0-20
	30-38	7.4-8.4	2.0-10	50-90
	38-80	6.6-8.4	2.0-6.0	0-40
TmaAU:				
Toto, undrained	0-24	5.6-7.3	150-200	0
	24-30	6.6-7.8	15-50	0-20
	30-38	7.4-8.4	2.0-10	50-90
	38-80	6.6-8.4	2.0-6.0	0-40
UbrA:				
Udorthents, clayey---------	0-80	7.4-8.4	11-26	20-30

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
W:				
Water.				
WmgA:				
Whiskerville----	0-9	6.1-7.3	13-20	0
	9-42	5.1-7.3	4.0-15	0
	42-80	7.4-8.4	11-26	20-30
Bronson---------	0-9	5.6-7.3	5.0-15	0
	9-20	5.1-7.3	2.0-10	0
	20-43	5.1-7.3	4.0-15	0
	43-56	5.1-7.3	1.0-5.0	0
	56-80	6.6-8.4	1.0-2.0	5-25
WmiA:				
Whitepost-------	0-12	6.1-6.5	6.0-17	0
	12-25	6.1-7.3	5.0-16	0
	25-40	6.1-7.3	2.0-9.0	0
	40-54	7.4-8.4	1.0-3.0	20-30
	54-80	7.4-8.4	11-26	20-30
Gilford---------	0-14	5.6-7.3	8.0-20	0
	14-32	5.6-7.3	4.0-16	0
	32-38	6.1-7.3	2.0-9.0	0
	38-80	6.6-8.4	1.0-7.0	0-40
WoeB:				
Williamstown----	0-7	5.6-7.3	3.0-13	0
	7-34	5.1-6.0	9.0-23	0
	34-56	6.6-8.4	6.0-16	0-40
	56-80	7.4-8.4	2.0-9.0	15-40
Crosier---------	0-11	5.6-7.3	4.0-15	0
	11-30	5.1-7.3	9.0-22	0
	30-80	7.4-8.4	5.0-14	15-40
WogA:				
Williamstown----	0-7	5.6-7.3	3.0-13	0
	7-34	5.1-6.0	9.0-23	0
	34-56	6.6-8.4	6.0-16	0-40
	56-80	7.4-8.4	2.0-9.0	15-40
WoxA:				
Williamstown----	0-7	5.6-7.3	3.0-13	0
	7-34	5.1-6.0	9.0-23	0
	34-56	6.6-8.4	6.0-16	0-40
	56-80	7.4-8.4	2.0-9.0	15-40
Winamac---------	0-12	5.6-7.3	3.0-13	0
	12-44	5.1-7.3	4.0-15	0
	44-58	6.1-8.4	1.0-3.0	0-20
	58-80	7.4-8.4	2.0-9.0	20-45
WoxB:				
Williamstown----	0-7	5.6-7.3	3.0-13	0
	7-34	5.1-6.0	9.0-23	0
	34-56	6.6-8.4	6.0-16	0-40
	56-80	7.4-8.4	2.0-9.0	15-40
Winamac---------	0-12	5.6-7.3	3.0-13	0
	12-44	5.1-7.3	4.0-15	0
	44-58	6.1-8.4	1.0-3.0	0-20
	58-80	7.4-8.4	2.0-9.0	20-45

Table 21.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Soil reaction	Cation-exchange capacity	Calcium carbonate
	In	pH	meq/100g	Pct
WpaA:				
Winamac---------	0-12	5.6-7.3	3.0-13	0
	12-44	5.1-7.3	4.0-15	0
	44-58	6.1-8.4	1.0-3.0	0-20
	58-80	7.4-8.4	2.0-9.0	20-45
Bronson---------	0-9	5.6-7.3	5.0-15	0
	9-20	5.1-7.3	2.0-10	0
	20-43	5.1-7.3	4.0-15	0
	43-56	5.1-7.3	1.0-5.0	0
	56-80	6.6-8.4	1.0-2.0	5-25
WpbA:				
Winamac---------	0-12	5.6-7.3	3.0-13	0
	12-44	5.1-7.3	4.0-15	0
	44-58	6.1-8.4	1.0-3.0	0-20
	58-80	7.4-8.4	2.0-9.0	20-45
WpbB:				
Winamac---------	0-12	5.6-7.3	3.0-13	0
	12-44	5.1-7.3	4.0-15	0
	44-58	6.1-8.4	1.0-3.0	0-20
	58-80	7.4-8.4	2.0-9.0	20-45
WrxAN:				
Wunabuna--------	0-21	6.1-7.8	10-15	0-15
	21-32	6.1-7.8	10-19	0-15
	32-38	6.1-7.8	15-36	0-15
	38-80	5.1-7.8	125-200	0-15

Table 22.--Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
AadAK:										
Abscota---------	A									
		January	1.5-3.0	>6.0	Apparent	---	---	---	---	---
		February	1.5-3.0	>6.0	Apparent	---	---	---	---	---
		March	1.5-3.0	>6.0	Apparent	---	---	---	Brief	Occasional
		April	1.5-3.0	>6.0	Apparent	---	---	---	Brief	Occasional
		May	2.0-4.0	>6.0	Apparent	---	---	---	Brief	Occasional
		June	2.0-4.0	>6.0	Apparent	---	---	---	Brief	Occasional
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	1.5-3.0	>6.0	Apparent	---	---	---	---	---
AatAN:										
Ackerman, drained--------	A									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	1.0-2.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
AatAU:										
Ackerman, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
AbhAN:										
Adrian, drained	A									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	1.0-2.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
AbhAU:										
Adrian, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
ApuAN:										
Antung, drained	A									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	1.0-2.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
ApuAU:										
Antung, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
BrvA:										
Brady-----------	B									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
BstA:										
Brems	A									
		January	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		February	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		March	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		April	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		June	2.5-4.5	>6.0	Apparent	---	---	---	---	---
		September	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	2.0-3.0	>6.0	Apparent	---	---	---	---	---
BstB:										
Brems	A									
		January	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		February	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		March	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		April	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		June	2.5-4.5	>6.0	Apparent	---	---	---	---	---
		September	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	2.0-3.0	>6.0	Apparent	---	---	---	---	---
BswA:										
Brems	A									
		January	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		February	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		March	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		April	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		June	2.5-4.5	>6.0	Apparent	---	---	---	---	---
		September	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	2.0-3.0	>6.0	Apparent	---	---	---	---	---
Morocco	B									
		January	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		August	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		September	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		November	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.5	>6.0	Apparent	---	---	---	---	---
BupB:										
Bronson	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
BuuA:										
Brookston-------	B/D									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	3.0-5.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-5.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	0.5-1.5	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
BuzA:										
Brookston-------	B/D									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	3.0-5.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-5.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	0.5-1.5	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Navunon---------	B/D									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	3.0-5.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-5.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
BwfA:										
Budd------------	B									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
BwfA:										
Brady	B									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---
CjfC:										
Chelsea	A									
		All months	>6.0	>6.0	---	---	---	---	---	---
CjfD:										
Chelsea	A									
		All months	>6.0	>6.0	---	---	---	---	---	---
CmbAI:										
Cohoctah	B									
		January	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		February	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		March	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		April	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		May	0.0-1.0	>6.0	Apparent	---	---	---	Brief	Frequent
		June	1.0-1.5	>6.0	Apparent	---	---	---	---	---
		July	1.5-3.3	>6.0	Apparent	---	---	---	---	---
		August	3.3-6.0	>6.0	Apparent	---	---	---	---	---
		September	3.3-6.0	>6.0	Apparent	---	---	---	---	---
		October	1.5-5.0	>6.0	Apparent	---	---	---	---	---
		November	1.0-1.5	>6.0	Apparent	---	---	---	Brief	Frequent
		December	0.0-1.0	>6.0	Apparent	---	---	---	Brief	Frequent
CnzAI:										
Cohoctah	B									
		January	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		February	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		March	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		April	0.0-0.5	>6.0	Apparent	---	---	---	Brief	Frequent
		May	0.0-1.0	>6.0	Apparent	---	---	---	Brief	Frequent
		June	0.0-1.5	>6.0	Apparent	---	---	---	---	---
		July	1.5-3.3	>6.0	Apparent	---	---	---	---	---
		August	3.3-6.0	>6.0	Apparent	---	---	---	---	---
		September	3.3-6.0	>6.0	Apparent	---	---	---	---	---
		October	1.5-5.0	>6.0	Apparent	---	---	---	---	---
		November	1.0-1.5	>6.0	Apparent	---	---	---	Brief	Frequent
		December	0.0-1.0	>6.0	Apparent	---	---	---	Brief	Frequent
Abscota	A									
		January	1.5-3.0	>6.0	Apparent	---	---	---	---	---
		February	1.5-3.0	>6.0	Apparent	---	---	---	---	---
		March	1.5-3.0	>6.0	Apparent	---	---	---	Brief	Occasional
		April	1.5-3.0	>6.0	Apparent	---	---	---	Brief	Occasional
		May	2.0-4.0	>6.0	Apparent	---	---	---	Brief	Occasional
		June	2.0-4.0	>6.0	Apparent	---	---	---	Brief	Occasional
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	1.5-3.0	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
CpcA:										
Conover---------	C									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---
CqmA:										
Corwin----------	B									
		January	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		February	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		March	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		April	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		December	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
CuyA:										
Crosier---------	C									
		January	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		February	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		March	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		April	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		December	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
DbsA:										
Denham----------	A									
		January	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		February	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		March	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		April	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		May	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	4.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		December	3.0-5.0	>6.0	Apparent	---	---	---	---	---
DbsB:										
Denham----------	A									
		January	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		February	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		March	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		April	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		May	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	4.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		December	3.0-5.0	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
EchAN:										
Edwards, drained	B									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	0.5-1.3	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	0.5-1.3	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
EchAU:										
Edwards, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
EcrAN:										
Edselton, drained--------	B									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	0.5-1.3	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	0.5-1.3	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
EcrAU:										
Edselton, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
GcwA:										
Gilford---------	B/D									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
GdvA:										
Gilford---------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Monon-----------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
GmnA:										
Goodell---------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Gilford---------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
GrfA:										
Granby	A/D									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		July	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		August	1.0-2.0	>6.0	Apparent	---	---	---	---	---
		September	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
GsaA:										
Granby	A/D									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		July	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		August	1.0-2.0	>6.0	Apparent	---	---	---	---	---
		September	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Gilford	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
HbzA:										
Headlee	C									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---
Brady	B									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
HnbA:										
Homer-----------	B									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---
HtbAN:										
Houghton, drained--------	A									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	1.0-2.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
HtbAU:										
Houghton, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
MfrAN:										
Madaus, drained	B									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	0.5-1.3	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	0.5-1.3	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
MfrAU:										
Madaus, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
MgyA:										
Maumee----------	A									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		July	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		August	1.0-2.0	>6.0	Apparent	---	---	---	---	---
		September	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Gilford---------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
MgzA:										
Maumee----------	A									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		July	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		August	1.0-2.0	>6.0	Apparent	---	---	---	---	---
		September	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
MgzA:										
Gumz------------	A/D									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		July	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		August	1.0-2.0	>6.0	Apparent	---	---	---	---	---
		September	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
MhaA:										
Maumee----------	A									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		July	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		August	1.0-2.0	>6.0	Apparent	---	---	---	---	---
		September	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
MhbA:										
Maumee----------	A									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	1.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		September	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		October	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
MhnA:										
Medaryville-----	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	---	---	---	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
MlwB:										
Metea-----------	B									
		All months	>6.0	>6.0	---	---	---	---	---	---
Moon------------	B									
		January	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		May	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		October	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
MmyC2:										
Miami-----------	B									
		January	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		February	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		March	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		April	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		May	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		June	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		October	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		November	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		December	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
MnzB:										
Miami-----------	B									
		January	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		February	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		March	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		April	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
		May	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		June	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		October	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		November	2.5-3.3	2.0-3.3	Perched	---	---	---	---	---
		December	2.0-3.3	2.0-3.3	Perched	---	---	---	---	---
Williamstown----	C									
		January	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		February	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		March	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		April	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		December	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
MouA:										
Milford---------	B/D									
		January	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	0.5-3.0	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
MtoA:										
Moon------------	B									
		January	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		May	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		October	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
Ormas-----------	B									
		All months	>6.0	>6.0	---	---	---	---	---	---
MtoB:										
Moon------------	B									
		January	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		May	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		October	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
Ormas-----------	B									
		All months	>6.0	>6.0	---	---	---	---	---	---
MtpA:										
Moon------------	B									
		January	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		May	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		October	2.0-3.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.5-3.0	1.7-3.3	Perched	---	---	---	---	---
Selfridge-------	B									
		January	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		May	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		September	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		October	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
MupA:										
Morocco---------	B									
		January	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		August	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		September	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		November	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.5	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
MvhAN:										
Moston, drained	A									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	0.5-1.3	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	0.5-1.3	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
MvhAU:										
Moston, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
MwzAN:										
Muskego, drained	A									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	0.5-1.3	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		July	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		August	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		September	4.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	1.3-4.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		November	0.5-1.3	>6.0	Apparent	0.0-2.0	Brief	Occasional	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
MwzAU:										
Muskego, undrained------	D									
		January	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		February	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		March	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		April	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		May	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---
		July	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		August	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		September	0.0	>6.0	Apparent	0.0-1.0	Brief	Occasional	---	---
		October	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		November	0.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0	>6.0	Apparent	0.0-2.0	Long	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table			Ponding			Flooding	
			Upper limit	Lower limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
NofA:										
Newton----------	D									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		July	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		August	1.0-2.0	>6.0	Apparent	---	---	---	---	---
		September	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.0	>6.0	Apparent	---	---	---	---	---
		November	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Morocco---------	B									
		January	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		August	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		September	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		November	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.5	>6.0	Apparent	---	---	---	---	---
OacA:										
Oakville--------	A									
		All months	>6.0	>6.0	---	---	---	---	---	---
Denham----------	A									
		January	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		February	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		March	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		April	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		May	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	4.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		December	3.0-5.0	>6.0	Apparent	---	---	---	---	---
OacB:										
Oakville--------	A									
		All months	>6.0	>6.0	---	---	---	---	---	---
Denham----------	A									
		January	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		February	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		March	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		April	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		May	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	4.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		December	3.0-5.0	>6.0	Apparent	---	---	---	---	---
OaeC:										
Oakville--------	A									
		All months	>6.0	>6.0	---	---	---	---	---	---
OaeD:										
Oakville--------	A									
		All months	>6.0	>6.0	---	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
OeaA:										
Odell-----------	B									
		January	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		February	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		March	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		April	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		June	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		October	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		November	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		December	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
OecA:										
Odell-----------	B									
		January	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		February	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		March	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		April	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		June	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		October	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		November	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		December	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
Francesville----	B									
		January	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		February	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		March	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		April	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		June	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		October	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		November	2.0-2.5	2.5-3.3	Perched	---	---	---	---	---
		December	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
Pmg:										
Pits, gravel----	A									
		All months	>6.0	>6.0	---	---	---	---	---	---
Pps:										
Pits, quarries, limestone.										
RebA:										
Radioville------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table			Ponding			Flooding	
			Upper limit	Lower limit	Kind	Surface water depth	Duration	Frequency	Duration	Frequency
RebA:										
Mermill	B									
		January	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-1.0	Brief	Rare	---	---
		July	3.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Rare	---	---
		August	---	---	---	0.0-1.0	Brief	Rare	---	---
		September	---	---	---	0.0-1.0	Brief	Rare	---	---
		October	3.0-6.7	>6.0	Apparent	0.0-1.0	Brief	Rare	---	---
		November	0.5-3.0	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	---	---
RevA:										
Rensselaer	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Radioville	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
ReyA:										
Rensselaer	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		July	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		August	---	---	---	0.0-0.5	Brief	Rare	---	---
		September	---	---	---	0.0-0.5	Brief	Rare	---	---
		October	3.0-6.7	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		November	1.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Rare	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
RhcA:										
Riddles	B									
		All months	>6.0	>6.0	---	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
ScuA:										
Sebewa----------	B/D									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-3.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
SdzcB:										
Selfridge-------	B									
		January	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		May	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		September	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		October	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
Brems-----------	A									
		January	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		February	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		March	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		April	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		June	2.5-4.5	>6.0	Apparent	---	---	---	---	---
		September	3.5-5.5	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	2.0-3.0	>6.0	Apparent	---	---	---	---	---
SgzA:										
Selfridge-------	B									
		January	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		May	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		September	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		October	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
ShaA:										
Selfridge-------	B									
		January	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		February	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		March	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		April	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		May	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		September	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		October	1.5-2.5	1.7-3.3	Perched	---	---	---	---	---
		November	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---
		December	1.0-2.0	1.7-3.3	Perched	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
ShaA:										
Morocco---------	B									
		January	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		August	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		September	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		November	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.5	>6.0	Apparent	---	---	---	---	---
SmsAK:										
Sloan-----------	B									
		January	0.0-0.5	>6.0	Apparent	0.0-1.0	Long	Frequent	Brief	Occasional
		February	0.0-0.5	>6.0	Apparent	0.0-1.0	Long	Frequent	Brief	Occasional
		March	0.0-0.5	>6.0	Apparent	0.0-1.0	Long	Frequent	Brief	Occasional
		April	0.0-0.5	>6.0	Apparent	0.0-1.0	Brief	Frequent	Brief	Occasional
		May	0.0-1.0	>6.0	Apparent	0.0-1.0	Brief	Frequent	Brief	Occasional
		June	1.0-1.5	>6.0	Apparent	0.0-0.5	Brief	Occasional	Brief	Occasional
		July	1.5-3.3	>6.0	Apparent	0.0-0.5	Brief	Occasional	Brief	Rare
		August	3.3-6.0	>6.0	Apparent	0.0-0.5	Brief	Occasional	Brief	Rare
		September	3.3-6.0	>6.0	Apparent	0.0-0.5	Brief	Occasional	Brief	Rare
		October	1.5-5.0	>6.0	Apparent	0.0-0.5	Brief	Occasional	Brief	Rare
		November	1.0-1.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	Brief	Rare
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	Brief	Rare
SnlA:										
Southwest-------	D									
		January	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.5	>6.0	Apparent	---	---	---	---	---
		July	3.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.5	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
SwiA:										
Strole----------	C									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
SwxA:										
Sumava----------	B									
		January	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		February	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		March	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		April	0.5-2.0	>6.0	Apparent	---	---	---	---	---
		May	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		June	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		October	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		November	2.0-4.0	>6.0	Apparent	---	---	---	---	---
		December	0.5-2.0	>6.0	Apparent	---	---	---	---	---
TmaAN:										
Toto, drained---	B									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		May	0.0-1.0	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	0.5-1.3	>6.0	Apparent	---	---	---	---	---
		July	1.3-4.0	>6.0	Apparent	---	---	---	---	---
		August	4.0-6.7	>6.0	Apparent	---	---	---	---	---
		September	4.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	1.3-4.0	>6.0	Apparent	---	---	---	---	---
		November	0.5-1.3	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
TmaAU:										
Toto, undrained	D									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		May	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	0.0-0.5	>6.0	Apparent	---	---	---	---	---
		July	0.0-0.5	>6.0	Apparent	---	---	---	---	---
		August	0.0-0.5	>6.0	Apparent	---	---	---	---	---
		September	0.5-2.5	>6.0	Apparent	---	---	---	---	---
		October	0.0-1.3	>6.0	Apparent	---	---	---	---	---
		November	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
UbrA:										
Udorthents, clayey---------	C									
		All months	>6.0	>6.0	---	---	---	---	---	---
W:										
Water.										
WmgA:										
Whiskerville----	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
WmgA:										
Bronson----------	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---
WmiA:										
Whitepost--------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
Gilford----------	B									
		January	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		February	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		March	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		April	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		May	0.0-2.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
		June	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		October	3.0-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.0-3.0	>6.0	Apparent	---	---	---	---	---
		December	0.0-1.0	>6.0	Apparent	0.0-0.5	Brief	Frequent	---	---
WoeB:										
Williamstown-----	C									
		January	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		February	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		March	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		April	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		December	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
Crosier----------	C									
		January	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		February	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		March	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		April	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-2.5	2.0-3.3	Perched	---	---	---	---	---
		December	0.5-2.0	2.0-3.3	Perched	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
WogA:										
Williamstown----	C									
		January	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		February	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		March	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		April	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		December	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
WoxA:										
Williamstown----	C									
		January	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		February	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		March	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		April	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		December	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
Winamac---------	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---
WoxB:										
Williamstown----	C									
		January	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		February	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		March	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		April	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
		May	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		June	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		October	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		November	2.0-3.0	2.0-3.3	Perched	---	---	---	---	---
		December	1.5-2.5	2.0-3.3	Perched	---	---	---	---	---
Winamac---------	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---

Table 22.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Water table: Kind	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
WpaA:										
Winamac	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---
Bronson	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---
WpbA:										
Winamac	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---
WpbB:										
Winamac	B									
		January	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		February	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		March	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		April	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		May	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		June	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		October	2.5-6.7	>6.0	Apparent	---	---	---	---	---
		November	1.5-2.5	>6.0	Apparent	---	---	---	---	---
		December	1.5-2.5	>6.0	Apparent	---	---	---	---	---
WrxAN:										
Wunabuna	B									
		January	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		February	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		March	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		April	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		May	0.0-1.3	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		June	1.3-3.0	>6.0	Apparent	---	---	---	---	---
		July	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		August	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		September	3.0-5.0	>6.0	Apparent	---	---	---	---	---
		October	1.3-3.0	>6.0	Apparent	---	---	---	---	---
		November	0.5-1.3	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---
		December	0.0-0.5	>6.0	Apparent	0.0-2.0	Brief	Frequent	---	---

Table 23.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer			Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness	Initial	Total		Uncoated steel	Concrete
		In		In	In			
AadAK:								
Abscota------------	---	>80	---	---	---	Low---------	Low---------	Low.
AatAN:								
Ackerman, drained--	---	>80	---	2-4	4-8	High--------	High--------	Low.
AatAU:								
Ackerman, undrained	---	>80	---	2-4	4-8	High--------	High--------	Low.
AbhAN:								
Adrian, drained----	---	>80	---	6-17	29-34	High--------	High--------	Moderate.
AbhAU:								
Adrian, undrained--	---	>80	---	6-17	29-34	High--------	High--------	Moderate.
ApuAN:								
Antung, drained----	---	>80	---	3-6	6-12	High--------	High--------	Moderate.
ApuAU:								
Antung, undrained--	---	>80	---	3-6	6-12	High--------	High--------	Moderate.
BrvA:								
Brady--------------	---	>80	---	---	---	High--------	Low---------	Moderate.
BstA:								
Brems--------------	---	>80	---	---	---	Low---------	Low---------	High.
BstB:								
Brems--------------	---	>80	---	---	---	Low---------	Low---------	High.
BswA:								
Brems--------------	---	>80	---	---	---	Low---------	Low---------	High.
Morocco------------	---	>80	---	---	---	Moderate----	Low---------	High.
BupB:								
Bronson------------	---	>80	---	---	---	High--------	Low---------	Moderate.
BuuA:								
Brookston----------	---	>80	---	---	---	High--------	High--------	Low.
BuzA:								
Brookston----------	---	>80	---	---	---	High--------	High--------	Low.
Navunon------------	Bedrock (lithic)	40-80	Indurated	---	---	High--------	High--------	Low.
BwfA:								
Budd---------------	---	>80	---	---	---	High--------	Low---------	Moderate.
Brady--------------	---	>80	---	---	---	High--------	Low---------	Moderate.
CjfC:								
Chelsea------------	---	>80	---	---	---	Low---------	Low---------	Low.
CjfD:								
Chelsea------------	---	>80	---	---	---	Low---------	Low---------	Low.
CmbAI:								
Cohoctah-----------	---	>80	---	---	---	High--------	High--------	Low.

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer			Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness	Initial	Total		Uncoated steel	Concrete
		In		In	In			
CnzAI:								
Cohoctah-----------	---	>80	---	---	---	High--------	High--------	Low.
Abscota------------	---	>80	---	---	---	Low---------	Low---------	Low.
CpcA:								
Conover------------	---	>80	---	---	---	High--------	High--------	Moderate.
CqmA:								
Corwin-------------	Dense material	24-40	Weakly cemented	---	---	Moderate----	High--------	Moderate.
CuyA:								
Crosier------------	Dense material	24-40	Weakly cemented	---	---	High--------	High--------	Low.
DbsA:								
Denham-------------	---	>80	---	---	---	Low---------	Low---------	Moderate.
DbsB:								
Denham-------------	---	>80	---	---	---	Low---------	Low---------	Moderate.
EchAN:								
Edwards, drained---	---	>80	---	4-12	19-24	High--------	High--------	Low.
EchAU:								
Edwards, undrained	---	>80	---	4-12	19-24	High--------	High--------	Low.
EcrAN:								
Edselton, drained--	---	>80	---	4-10	15-21	High--------	High--------	Low.
EcrAU:								
Edselton, undrained	---	>80	---	4-10	15-21	High--------	High--------	Low.
GcwA:								
Gilford------------	---	>80	---	---	---	High--------	High--------	Moderate.
GdvA:								
Gilford------------	---	>80	---	---	---	High--------	High--------	Moderate.
Monon--------------	Bedrock (lithic)	40-80	---	---	---	High--------	High--------	Moderate.
GmnA:								
Goodell------------	---	>80	---	---	---	High--------	High--------	Moderate.
Gilford------------	---	>80	---	---	---	High--------	High--------	Moderate.
GrfA:								
Granby-------------	---	>80	---	---	---	Moderate----	High--------	Low.
GsaA:								
Granby-------------	---	>80	---	---	---	Moderate----	High--------	Low.
Gilford------------	---	>80	---	---	---	High--------	High--------	Moderate.
HbzA:								
Headlee------------	---	>80	---	---	---	High--------	High--------	Moderate.
Brady--------------	---	>80	---	---	---	High--------	Low---------	Moderate.
HnbA:								
Homer--------------	---	>80	---	---	---	High--------	High--------	High.
HtbAN:								
Houghton, drained--	---	>80	---	6-18	55-60	High--------	High--------	Moderate.

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer			Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness	Initial	Total		Uncoated steel	Concrete
		In		In	In			
HtbAU:								
Houghton, undrained	---	>80	---	6-18	55-60	High	High	Moderate.
MfrAN:								
Madaus, drained	---	>80	---	2-4	5-9	High	High	Low.
MfrAU:								
Madaus, undrained	---	>80	---	2-4	5-9	High	High	Low.
MgyA:								
Maumee	---	>80	---	---	---	Moderate	High	Moderate.
Gilford	---	>80	---	---	---	High	High	Moderate.
MgzA:								
Maumee	---	>80	---	---	---	Moderate	High	Moderate.
Gumz	---	>80	---	---	---	Moderate	High	Low.
MhaA:								
Maumee	---	>80	---	---	---	Moderate	High	Moderate.
MhbA:								
Maumee	---	>80	---	---	---	Moderate	High	Moderate.
MhnA:								
Medaryville	---	>80	---	---	---	High	High	Moderate.
MlwB:								
Metea	---	>80	---	---	---	Moderate	Moderate	Moderate.
Moon	---	>80	---	---	---	Moderate	Moderate	Moderate.
MmyC2:								
Miami	Dense material	24-40	Weakly cemented	---	---	Moderate	Moderate	Moderate.
MnzB:								
Miami	Dense material	24-40	Weakly cemented	---	---	Moderate	Moderate	Moderate.
Williamstown	Dense material	24-40	Weakly cemented	---	---	Moderate	Moderate	Moderate.
MouA:								
Milford	---	>80	---	---	---	High	High	Low.
MtoA:								
Moon	---	>80	---	---	---	Moderate	Moderate	Moderate.
Ormas	---	>80	---	---	---	Moderate	Low	Moderate.
MtoB:								
Moon	---	>80	---	---	---	Moderate	Moderate	Moderate.
Ormas	---	>80	---	---	---	Moderate	Low	Moderate.
MtpA:								
Moon	---	>80	---	---	---	Moderate	Moderate	Moderate.
Selfridge	---	>80	---	---	---	High	High	Low.
MupA:								
Morocco	---	>80	---	---	---	Moderate	Low	High.

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Subsidence: Initial	Subsidence: Total	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In		In	In			
MvhAN:								
Moston, drained	---	>80	---	6-12	15-24	High	Moderate	Moderate.
MvhAU:								
Moston, undrained	---	>80	---	6-12	15-24	High	Moderate	Moderate.
MwzAN:								
Muskego, drained	---	>80	---	10-15	25-30	High	Moderate	Moderate.
MwzAU:								
Muskego, undrained	---	>80	---	10-15	25-30	High	Moderate	Moderate.
NofA:								
Newton	---	>80	---	---	---	Moderate	High	High.
Morocco	---	>80	---	---	---	Moderate	Low	High.
OacA:								
Oakville	---	>80	---	---	---	Low	Low	Moderate.
Denham	---	>80	---	---	---	Low	Low	Moderate.
OacB:								
Oakville	---	>80	---	---	---	Low	Low	Moderate.
Denham	---	>80	---	---	---	Low	Low	Moderate.
OaeC:								
Oakville	---	>80	---	---	---	Low	Low	Moderate.
OaeD:								
Oakville	---	>80	---	---	---	Low	Low	Moderate.
OeaA:								
Odell	Dense material	24-40	Weakly cemented	---	---	High	High	Moderate.
OecA:								
Odell	Dense material	24-40	Weakly cemented	---	---	High	High	Moderate.
Francesville	Dense material	24-40	Weakly cemented	---	---	High	High	Moderate.
	Bedrock (lithic)	40-80	Indurated					
Pmg:								
Pits, gravel	---	>80	---	---	---	Low	Low	Low.
Pps:								
Pits, quarries, limestone.								
RebA:								
Radioville	---	>80	---	---	---	High	Moderate	Low.
Mermill	---	>80	---	---	---	High	Moderate	Moderate.
RevA:								
Rensselaer	---	>80	---	---	---	High	Moderate	Low.
Radioville	---	>80	---	---	---	High	Moderate	Low.
ReyA:								
Rensselaer	---	>80	---	---	---	High	Moderate	Low.

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Subsidence: Initial	Subsidence: Total	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In		In	In			
RhcA:								
Riddles	---	>80	---	---	---	Moderate	Moderate	Moderate.
ScuA:								
Sebewa	---	>80	---	---	---	High	High	Low.
SdzcB:								
Selfridge	---	>80	---	---	---	High	High	Low.
Brems	---	>80	---	---	---	Low	Low	High.
SgzA:								
Selfridge	---	>80	---	---	---	High	High	Low.
ShaA:								
Selfridge	---	>80	---	---	---	High	High	Low.
Morocco	---	>80	---	---	---	Moderate	Low	High.
SmsAK:								
Sloan	---	>80	---	---	---	High	High	Low.
SnlA:								
Southwest	---	>80	---	---	---	High	High	Low.
SwiA:								
Strole	---	>80	---	---	---	High	High	Moderate.
SwxA:								
Sumava	---	>80	---	---	---	Moderate	Moderate	Low.
TmaAN:								
Toto, drained	---	>80	---	2-7	10-22	High	High	Moderate.
TmaAU:								
Toto, undrained	---	>80	---	2-7	10-22	High	High	Moderate.
UbrA:								
Udorthents, clayey	---	>80	---	---	---	Moderate	High	Moderate.
W:								
Water.								
WmgA:								
Whiskerville	---	>80	---	---	---	High	Low	Moderate.
Bronson	---	>80	---	---	---	High	Low	Moderate.
WmiA:								
Whitepost	---	>80	---	---	---	High	High	Moderate.
Gilford	---	>80	---	---	---	High	High	Moderate.
WoeB:								
Williamstown	Dense material	24-40	Weakly cemented	---	---	Moderate	Moderate	Moderate.
Crosier	Dense material	24-40	Weakly cemented	---	---	High	High	Low.
WogA:								
Williamstown	Dense material	24-40	Weakly cemented	---	---	Moderate	Moderate	Moderate.

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Subsidence: Initial	Subsidence: Total	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In		In	In			
WoxA:								
Williamstown-------	Dense material	24-40	Weakly cemented	---	---	Moderate----	Moderate----	Moderate.
Winamac------------	---	>80	---	---	---	High--------	Low---------	Moderate.
WoxB:								
Williamstown-------	Dense material	24-40	Weakly cemented	---	---	Moderate----	Moderate----	Moderate.
Winamac------------	---	>80	---	---	---	High--------	Low---------	Moderate.
WpaA:								
Winamac------------	---	>80	---	---	---	High--------	Low---------	Moderate.
Bronson------------	---	>80	---	---	---	High--------	Low---------	Moderate.
WpbA:								
Winamac------------	---	>80	---	---	---	High--------	Low---------	Moderate.
WpbB:								
Winamac------------	---	>80	---	---	---	High--------	Low---------	Moderate.
WrxAN:								
Wunabuna-----------	---	>80	---	---	---	High--------	Moderate----	Low.